

# Extent of Corporate Sustainability Disclosure in India: A Study with Special reference to the Economical Aspect of GRI Standards

Rupam Majumder<sup>1</sup>, Dr. Ahmed Hussain<sup>2</sup>

<sup>1</sup>Research Scholar, Department of Commerce, Raiganj University, West Bengal, India

<sup>2</sup>Assistant Professor, Department of Commerce, Raiganj University, West Bengal, India

## ABSTRACT

The study aims to examine and analyse the present corporate sustainability reporting practices of corporate India based on GRI standards 2016. Our study is confined to the reporting of Economical Aspect as prescribed in the latest GRI Standard. For the purpose of the study, we thoroughly examined the sustainability reports of 37 Indian companies during 2016-17 to 2019-2020. The selection of the sample companies was based on their "Core & Comprehensive Status" as outlined in the GRI's comprehensive table. Using an unweighted disclosure checklist comprised of 13 economic aspect parameters, our study assesses the compliance level of corporate sustainability reporting of economical aspect as guided by GRI standards. The result shows that the minimum disclosure is of 16.67% which is extremely low level of disclosure while the maximum score is 100% indicating full compliance of GRI standard. The average disclosure score (73.02%) indicates a moderately satisfactory level of disclosure in Indian context. The study shows a wide variation in economical aspect disclosure which is evident from the range of 83.33%. Based on these research findings, it can be inferred that there still exists considerable scope for improvement in reporting the economic aspects by companies in India.

**Keywords:** GRI Standards, Corporate Sustainability Reports, Annual Reports, Economic Aspects, India

## INTRODUCTION

Economic sustainability is a holistic approach to economic development that considers the long-term consequences of economic activities on social, environmental, and cultural factors. It strives to achieve a balance between economic growth and the preservation of natural resources, social equity, and cultural heritage. Economic sustainability involves creating economic value out of whatever project or decision you are undertaking. Economic sustainability means that decisions are made in the most equitable and fiscally sound way possible while considering the other aspects of sustainability.

“Economic sustainability refers to practices that support long-term economic growth without negatively impacting social, environmental, and cultural aspects of the community.” – **University of Mary Washington, Economic**

## Sustainability

The main principles of economic sustainability:

- **Efficient resource use:** Economic activities should be conducted in a way that minimizes the use of resources and maximizes their value. This includes using renewable resources, reducing waste, and adopting energy-efficient technologies.
  - **Social equity:** Economic growth should be shared equitably among all members of society. This means ensuring that everyone has access to education, healthcare, and other essential services.
  - **Environmental protection:** Economic activities should not harm the environment. This includes reducing pollution, conserving biodiversity, and protecting natural habitats.
  - **Cultural preservation:** Economic development should respect and preserve cultural heritage. This includes protecting traditional customs, languages, and art forms.
  - **Long-term planning:** Economic decisions should be made with the long-term in mind. This means considering the impacts of economic activities on future generations.
- Economic sustainability is essential for achieving sustainable development. It is a way to ensure that economic growth can continue without causing irreparable damage to the environment or society.

Since the 1970s, the concept of sustainability has evolved to encompass the well-being of humanity on Earth; leading to the most frequently cited definitions of sustainability and sustainable development. The United Nations World Commission on Environment and Development defines sustainable development as "development that fulfils the needs

of the present without jeopardizing the ability of future generations to fulfil their own." This definition encompasses three interconnected objectives: environmental, economic, and social aspects. Since 1987, there has been a noticeable surge in the incorporation of sustainable development principles across various fields. This trend is apparent through the growing volume of articles on sustainable development and the proliferation of journals specializing in economic engineering.

Researchers from diverse backgrounds have contributed empirical research to gain deeper insights into areas relating to social and environmental aspect of sustainability. In this context, an attempt has been made to study sustainability disclosure with regard to economic aspect by Indian corporate.

## REVIEW OF LITERATURE

There have been numerous studies on sustainability reporting with reference to the Global Reporting Initiative (GRI) in foreign countries in the past decades. These studies have examined various aspects of sustainability reporting, including the extent of disclosure, the quality of disclosure, and the factors that influence disclosure practices. Some selected relevant literatures have been reviewed in this context.

**Orazalin & Mahmood(2019)** investigated the extent and determinants of sustainability performance disclosures (SR) based on GRI guidelines of 146 companies listed on the Kazakhstani Stock Exchange for the years 2013-2015. The study found that the average SR index is 9.88 percent, indicating that SR practices in Kazakhstan are at an early stage of development. Stand-alone reporting, reporting language, firm profitability, firm size, and auditor type significantly influence the extent, nature, and quality of SR practices.

**Putri et al, (2020)** examined the dominant sustainability indicators in each industry classification based on sustainability reports. They analysed sustainability reports of 28 listed Indonesian GRI G4-based companies for the year 2016-2017. A checklist of 91 indicators of economic, environmental, and social impacts from GRI G4 guidelines was used to assess the quality of disclosure. The study uses K-means clustering analysis to identify the dominant indicators in each industry classification. Stakeholder theory and legitimacy theory were used to explain the theoretical framework. It was found that there are significant differences in the quality of disclosure on each GRI G4 indicator in the sustainability reports of companies listed on the IDX in 2016-2017 in each industry characteristic. The dominant indicator expressed in the financial industry is an economic indicator. In the mining, transportation and infrastructure industries, various industries, and basic and chemical industries, the dominant indicators to be disclosed are environmental indicators.

**Johansson & Zametica (2019)** assessed the relationship between sustainability reporting quality and financial performance, measured in terms of return on assets (ROA) and firm value, assessed by Tobin's Q, within the Swedish manufacturing industry. The study analyzes data from 30 manufacturing companies over the period spanning 2015 to 2017. A comprehensive checklist, comprising 92 items encompassing economic, environmental, and social aspects, was employed for analysis. It was found that there is a positive relationship between the quality of sustainability reports and ROA at a 5% significance level. The study provided statistical evidence of improvement in the quality of sustainability reports with enhanced financial performance.

**Kaur & Das (2015)** examined and compared the level of sustainability reporting of 53 private mining companies and 47 public mining companies in India. The study used a disclosure index GRI Guidelines for measuring the disclosure level. Independent t-test was used to compare the disclosure practices of private and public mining companies. The study showed that there is a high variation in the disclosure practices of Indian private and public sector mining companies. Public sector mining companies disclose more information on sustainability issues than private sector mining companies.

**Dutta et al, (2011)** examined the applicability of the concept of Triple Bottom Line Reporting (TBLR) in line with the Global Reporting Initiative (GRI) Guidelines, They attempted to examine the extent of Corporate Social Responsibility (CSR) disclosure by Indian companies under GRI, to examine the present status of sustainability-based reporting as per Karmayog, and to make a comparative study of GRI-based companies under Karmayog CSR activities. The study considers three parameters: people, environment, and profit. The sample consists of 19 Indian companies selected following random sampling method. Content analysis was used to measure the disclosure level. The findings revealed that the extent of CSR disclosure by Indian companies under GRI is moderate. The present status of sustainability-based reporting as per Karmayog is low. There is a significant difference in the CSR disclosure practices of GRI-based companies under Karmayog.

The following important observations have also been highlighted regarding disclosure practices especially in foreign context.

- i) Tanimoto and Suzuki (2005) found that Japanese companies were more likely to disclose environmental information than economic or social information.
- ii) Ho and Taylor (2007) found that Australian companies were more likely to disclose sustainability information in their annual reports than in stand-alone reports.
- iii) Staksson and Steimle (2009) found that German companies were more likely to disclose sustainability information in response to stakeholder pressure than to regulatory requirements.
- iv) Cardoso et al. (2014) found that Brazilian companies with higher levels of environmental and social disclosure tended to have a higher potential for pollution and a greater impact on people's lives.
- v) Stoma et al. (2017) found that Polish companies were more likely to disclose sustainability information in their sustainability reports than in their integrated reports.
- vi) Orazalin and Mahmood (2019) found that Kazakhstani companies were more likely to disclose sustainability information in English than in their native language.
- vii) Waiznaik and Pactwa (2019) found that Polish companies were more likely to disclose their own sustainability indicators than GRI indicators.
- viii) Putri et al. (2020) found that Indonesian companies in the financial industry were more likely to disclose economic indicators, while companies in other industries were more likely to disclose environmental indicators.
- ix) Setyorini and Ishak (2012) found that Indonesian companies were more likely to disclose social and environmental information than economic information.

In Indian context, the studies on disclosure practices of Indian companies in line with GRI Standards are very limited. In this backdrop, an attempt has been made to examine and analyse the present corporate sustainability reporting practices of corporate India based on GRI standards with Special reference to the Economical Aspect of disclosure.

#### **Objectives of the Study**

The objective of the research is to empirically measure and analyze the extent of Corporate Sustainability Reporting in India based on GRI Standards on economical aspect.

#### **RESEARCH METHODOLOGY**

In order to examine the economic aspect of disclosure based on GRI Standards, the present study has used sustainability reports of 37 sample companies for the years 2016-2017 to 2019-2020. The sample consists of all companies available on GRI database having status of 'Core' and 'Comprehensive' In the next step, an economic aspect of disclosure checklist comprised of 13 information items was prepared based on GRI Content Index. Dichotomous scoring approach was used to measure the extent of disclosure.

#### **Empirical results relating to the Extent of Economical Disclosure**

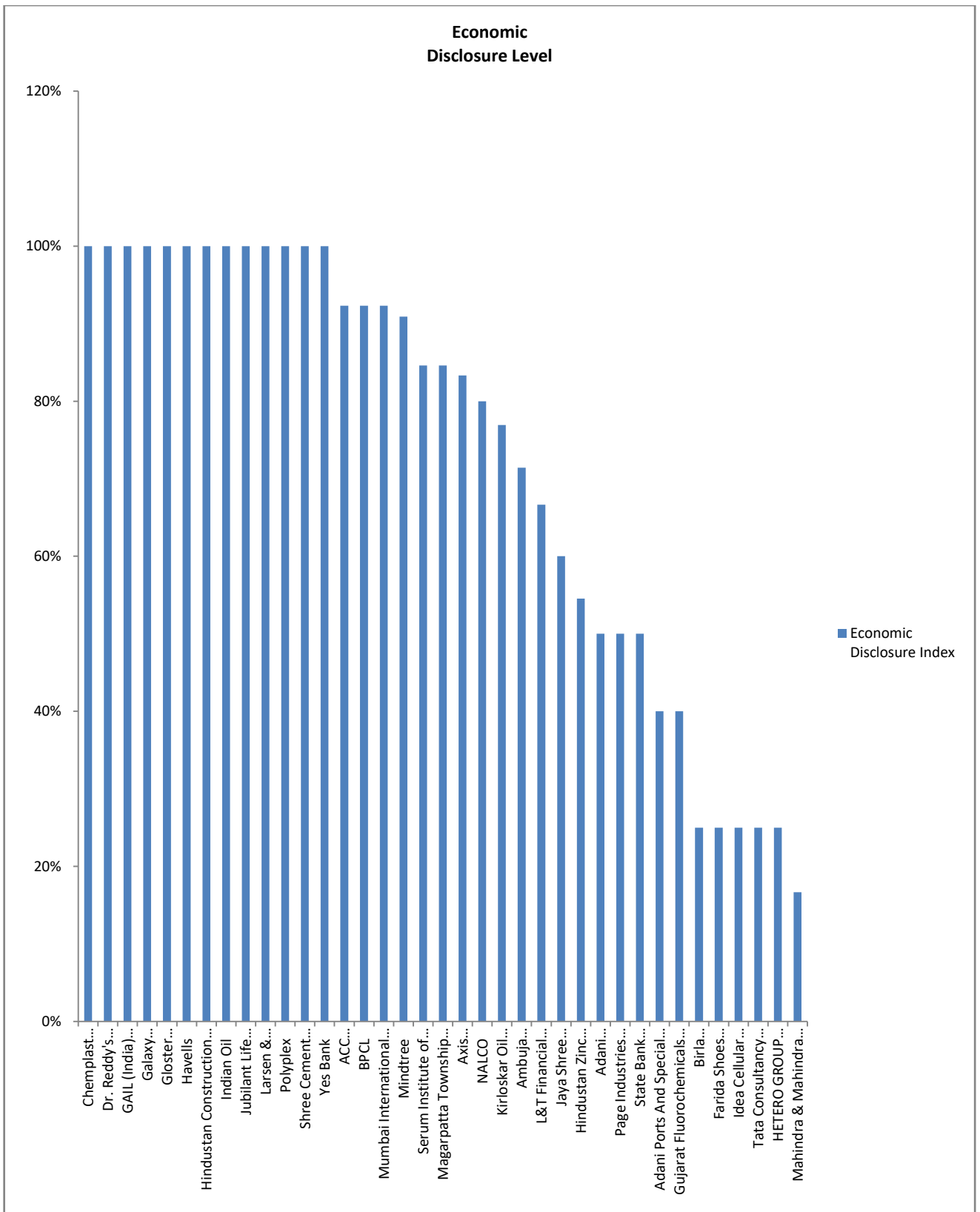
Economical GRI disclosure score of all 37 sample companies is reported in the Table 1 and presented in Chart 1.

**Table 1 Economic Disclosure Score of Sample Companies (in Descending Order)**

Sl. No	Name of the Company	Company Code	Economic Disclosure Level
1	Chemplast Sanmar Limited	C 8	100%
2	Dr. Reddy's Laboratory	C 9	100%
3	GAIL (India) Limited	C 11	100%
4	Galaxy Surfactants Ltd.	C 12	100%
5	Gloster Limited	C 13	100%
6	Havells	C 15	100%
7	Hindustan Construction Company Limited	C 16	100%

8	Indian Oil	C 19	100%
9	Jubilant Life Sciences Ltd	C 21	100%
10	Larsen & Toubro	C 24	100%
11	Polyplex	C 29	100%
12	Shree Cement Limited	C 31	100%
13	Yes Bank	C 34	100%
14	ACC Limited	C 1	92%
15	BPCL	C 7	92%
16	Mumbai International Airport	C 37	92%
17	Mindtree	C 26	91%
18	Serum Institute of India Pvt. Ltd.	C 30	85%
19	Magarpatta Township Development & Construction Company Limited	C 36	85%
20	Axis Bank	C 5	83%
21	NALCO	C 27	80%
22	Kirloskar Oil Engines	C 22	77%
23	Ambuja Cements	C 4	71%
24	L&T Financial Services	C 23	67%
25	Jaya Shree Textiles	C 20	60%
26	Hindustan Zinc Limited	C 17	55%
27	Adani Power	C 3	50%
28	Page Industries Limited	C 28	50%
29	State Bank of India	C 32	50%
30	Adani Ports And Special Economic Zone Ltd.	C 2	40%
31	Gujarat Fluorochemicals Limited	C 14	40%
32	Birla Cellulose	C 6	25%
33	Farida Shoes Private Limited	C 10	25%
34	Idea Cellular Ltd	C 18	25%
35	Tata Consultancy Services (TCS)	C 33	25%
36	Hetero Group of Companies	C 35	25%
37	Mahindra & Mahindra Limited	C 25	17%

*Source: Computed from information reported*



**Analysis of the Extent relating to the Disclosure score in Economic Category of Information**

With a view to making analysis, the economic aspect of disclosure scores has been classified into different groups. Such classification has been presented in Table 2

**Table 2 Frequency Distribution of Economic GRI Standards Disclosure Score**

Disclosure Scores	Sample Companies		Cumulative Sample Companies			
	Number	%	More than Type		Less than Type	
			Number	%	Number	%
Col. (1)	Col. (2)	Col. (3)	Col. (4)	Col.(5)	Col.(6)	Col.(7)
Above 90%	17	46%	17	46%	20	54%
80% - 90%	3	8%	20	54%	17	46%
70% - 80%	3	8%	23	62%	14	38%
60% - 70%	1	3%	24	65%	13	35%
50% - 60%	2	5%	26	70%	11	30%
40% - 50%	3	8%	29	78%	8	22%
30%-40%	2	5%	31	84%	6	16%
20% - 30%	5	14%	36	97%	1	3%
10% - 20%	1	3%	37	100%	0	0%
	<b>37</b>	<b>100%</b>				

*Source: Computed from Total Economic Disclosure Score Presented in Table 1*

The information presented in Table 2 reveals the following:

- i) The maximum number of companies (17) representing 46% of sample companies have extent of economic disclosure above 90%.
- ii) 62% companies have disclosed more than 70% GRI standards information.
- iii) Only one company has disclosed below 20%.

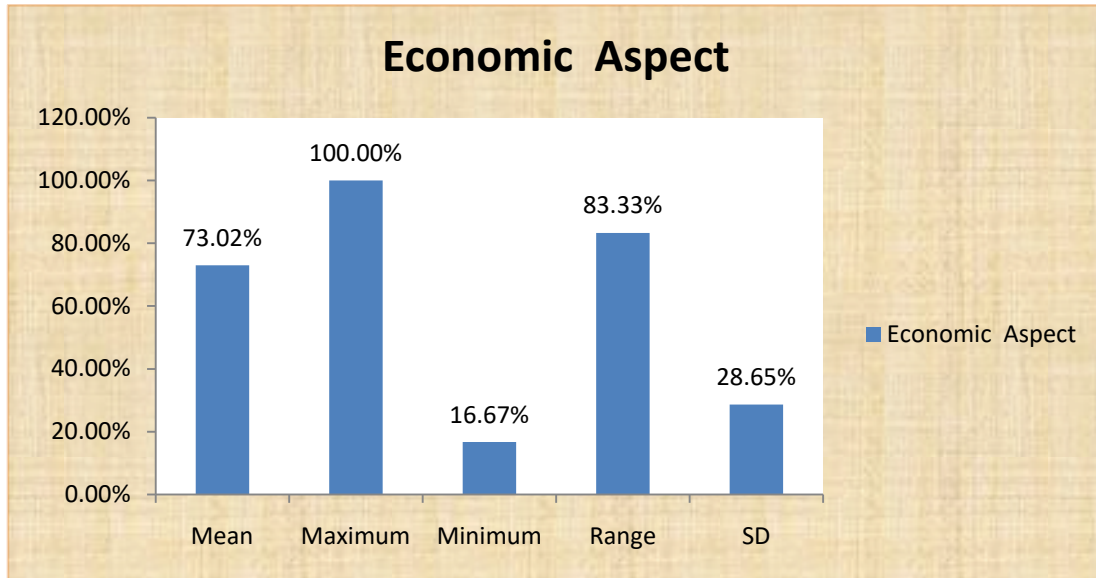
**Analyses of the Extent of Disclosure in Economic Category of GRI Standards Information**

For making further analysis, some descriptive statistics have been calculated using the Economical aspect of disclosure scores which are presented in Chart 2 and Table 3

**Table 3 Table showing descriptive statistics of Economic Information**

Information	Economic Aspect
Disclosure Items	13
Sample Size	37
Mean	73.02%
Maximum	100.00%
Minimum	16.67%
Range	83.33%
SD	28.65%

*Source: Computed from information reported*



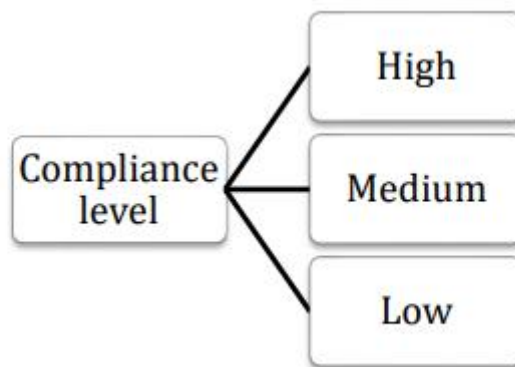
From the information presented in Table 3, we have the following important observations in respect of overall economic disclosure reporting by our sample companies

- (i) Extent of GRI standards disclosures varies from 16.67% to 100.00% yielding a range of 83.33%.
- (ii) Mean Disclosure of 73.02 per cent indicates that average level of GRI standards economic information disclosure is moderate.
- (iii) Minimum disclosure of 16.67 per cent is very low.
- (iv) Maximum disclosure 100 is per cent. 13 out of 37 sample companies representing 35% have disclosed all information relating to economic aspect.
- (v) A wide variation is observed in the extent of economic disclosure which is evident from range of 83.33% and standard deviation of 28.65%.

**Level of Compliance**

As per Hewaidy and Al Mutawaa (2010), compliance levels are categorized into four distinct tiers. A disclosure level of 80 percent or more is classified as a high level of compliance. The intermediate range falls between 60 and 79 percent, while compliance within the range of 40 to 59 percent is considered low. Any figure below 40 percent signifies a substantial disparity between the prescribed disclosure requirements and the IFRS standards. We have used this compliance level to examine the disclosure level in our sample companies. However, this study has opted for a three-tier compliance classification, as illustrated in the subsequent figure, due to the absence of items falling below the 40 percent threshold.

The Compliance level is shown in the following figure.



**Source: Hewaidy and Mutawaa**

Based on the previous studies, the researchers divide the compliance level into three levels as discussed above during the period 2019-2020:

**Table No 4 Table showing the compliance level**

Sl. No	Level of Compliance	Disclosure Category	Number of Sample Companies
A	High Level of Compliance	Above 80%	21
B	Medium Level of Compliance	Between 61% and 80%	4
C	Low Level of Compliance	Below 60%	12
	<b>Total Number of Companies</b>		<b>37</b>

**Table No 5 Table showing the disclosure category of sample companies based on economic aspect of GRI Standards**

Sl. No	Name of the Company	Company Code	Economic Disclosure Index	Disclosure Category
1	ChemplastSanmar Limited	C 8	100%	High
2	Dr. Reddy's Laboratory	C 9	100%	High
3	GAIL (India) Limited	C 11	100%	High
4	GalaxySurfactants Ltd.	C 12	100%	High
5	Gloster Limited	C 13	100%	High
6	Havells	C 15	100%	High
7	Hindustan Construction Company Limited	C 16	100%	High
8	Indian Oil	C 19	100%	High
9	Jubilant Life Sciences Ltd	C 21	100%	High
10	Larsen & Toubro	C 24	100%	High
11	Polyplex	C 29	100%	High
12	Shree Cement Limited	C 31	100%	High
13	Yes Bank	C 34	100%	High
14	ACC Limited	C 1	92%	High
15	BPCL	C 7	92%	High
16	Mumbai International Airport	C 37	92%	High
17	Mindtree	C 26	91%	High
18	Serum Institute of India Pvt. Ltd.	C 30	85%	High
19	Magarpatta Township Development & Construction Company Limited	C 36	85%	High
20	Axis Bank	C 5	83%	High
21	NALCO	C 27	80%	High
22	Kirloskar Oil Engines	C 22	77%	Medium
23	Ambuja Cements	C 4	71%	Medium
24	L&T Financial Services	C 23	67%	Medium
25	Jaya Shree Textiles	C 20	60%	Medium
26	Hindustan Zinc Limited	C 17	55%	low
27	Adani Power	C 3	50%	low
28	Page Industries Limited	C 28	50%	low
29	State Bank of India	C 32	50%	low
30	Adani Ports And Special Economic Zone Ltd.	C 2	40%	low
31	Gujarat Fluorochemicals Limited	C 14	40%	low
32	Birla Cellulose	C 6	25%	low
33	Farida Shoes Private Limited	C 10	25%	low



34	Idea Cellular Ltd	C 18	25%	low
35	Tata Consultancy Services (TCS)	C 33	25%	low
36	Hetero Group of Companies	C 35	25%	low
37	Mahindra & Mahindra Limited	C 25	17%	low

Source: Computed from examination of Sustainability Reports

From the above table we found that 21 out of 37 sample companies representing 57% have high level of compliance followed by 32% (12 out of 37 sample companies) have low level of compliance and 4 companies comprising 11% have moderate level of compliance.

**Table No 6 Table showing applicability and non-applicability of GRI standards/sub-standards**

Name of the Company	Company Code	Economic Aspect		
		No. of Standards/sub-standards applicable	No. of Standards/sub-standards not applicable	Total Economic Aspect
ACC Limited	C 1	13	0	13
Adani Ports And Special Economic Zone Ltd.	C 2	5	8	13
Adani Power	C 3	10	3	13
Ambuja Cements	C 4	7	6	13
Axis Bank	C 5	6	7	13
Birla Cellulose	C 6	4	9	13
BPCL	C 7	13	0	13
ChemplastSanmar Limited	C 8	12	1	13
Dr. Reddy's Laboratory	C 9	8	5	13
Farida Shoes Private Limited	C 10	4	9	13
GAIL (India) Limited	C 11	13	0	13
Galaxy Surfactants Ltd.	C 12	6	7	13
Gloster Limited	C 13	8	5	13
Gujarat Fluorochemicals Limited	C 14	5	8	13
Havells	C 15	12	1	13

Hindustan Construction Company Limited	C 16	5	8	13
Hindustan Zinc Limited	C 17	11	2	13
Idea Cellular Ltd	C 18	4	9	13
Indian Oil	C 19	13	0	13
Jaya Shree Textiles	C 20	5	8	13
Jubilant Life Sciences Ltd	C 21	13	0	13
Kirloskar Oil Engines	C 22	13	0	13
L&T Financial Services	C 23	6	7	13
Larsen & Toubro	C 24	13	0	13
Mahindra & Mahindra Limited	C 25	6	7	13
Mindtree	C 26	11	2	13
NALCO	C 27	10	3	13
Page Industries Limited	C 28	8	5	13
Polyplex	C 29	11	2	13
Serum Institute of India Pvt. Ltd.	C 30	13	0	13
Shree Cement Limited	C 31	5	8	13
State Bank of India	C 32	6	7	13
Tata Consultancy Services (TCS)	C 33	4	9	13
Yes Bank	C 34	6	7	13
Hetero Group Of Companies	C 35	4	9	13

Source: Computed from examination of Sustainability Reports

**Table No 7 Table showing the Level of compliance of sample companies**

Level of Compliance	Number of information items	Frequency	Percentage
Yes (Reported)	13	248	51.56%
No (Not reported)	13	70	14.55%
Not Applicable	13	163	33.89%
<b>Total</b>	<b>13</b>	<b>481</b>	<b>100.00%</b>

Disclosure variation among the sample companies occurs due to number of standards applicable for disclosure depending upon its nature of operation as given in above table no:6.

Magarpatta Township Development & Construction Company Limited	C 36	13	0	13
Mumbai International Airport	C 37	12	1	13

Source: Computed from examination of Sustainability Reports

From the above table we found that 51.56% of economic aspect has been disclosed by 37 sample companies during the period 2019-2020 followed by 14.55% has not disclosed the economic information and 33.89% of economic information are not applicable to our sample companies.

### Test of Hypothesis

To study the industry wise sustainability disclosure practices of Indian companies; the companies reporting in line with GRI Standards for the year 2019-2020 were grouped into specific industry. Percentage mean scores were obtained to study industry wise sustainability disclosure practices. This has been shown in Table No:8 below:

**Table No 8 Table showing the calculation of Percentage mean scores based on economic disclosure scores**

Sl. No	Company Name	Sector	Industry	Percent age	Percent age			
			Group	Score	Mean Score			
1	Mumbai International Airport	Air Line service	Service	0.92	0.82			
	Mindtree					Consumer Service		
3	Hindustan Construction Company Limited	Construction of dams, tunnels etc						
	Magarpatta Township Development & Construction Company Limited	Real estate and construction services						
5	Dr. Reddy's Laboratory	Healthcare Products						
6	Tata Consultancy Services (TCS)	IT services, consulting, and business solutions						
7	BPCL	Oil & Gas Company				REFINERIES	0.92	0.92
8	GAIL (India) Limited	OIL DRILLING AND						
		EXPLORATION						

9	Indian Oil	Oil & Gas Company		1	
10	Kirloskar Oil Engines	Oil & Gas Company		0.77	
11	NALCO	Mining	Energy Utilities	0.8	<b>0.62</b>
12	Adani Power	Thermal Power		0.5	
13	Hindustan Zinc Limited	Mining		0.55	
14	Yes Bank	Banking	Finance	1	<b>0.63</b>
15	Axis Bank	Banking		0.83	
16	Mahindra & Mahindra	FINANCE - LEASING &		0.17	
	Limited	HIRE PURCHASE			
17	State Bank of India	Banking		0.5	
18	L&T Financial	FINANCE - LEASING &		0.67	
	Services	HIRE PURCHASE			
19	Havells	Equipment	Manufacturing	1	<b>0.70</b>
20	Shree Cement Limited	CEMENT - MAJOR		1	
21	ChemplastSanmar Limited	Chemicals		1	
22	ACC Limited	CEMENT - MAJOR		0.92	
23	Farida Shoes Private Limited	Leather Products		0.25	
24	Polyplex	Metals		1	
25	Serum Institute of India Pvt. Ltd.	Health products and Pharmaceuticals		0.85	
26	Gloster Limited	Textiles and Apparel		1	
27	Idea Cellular Ltd	Equipment		0.25	
28	Ambuja Cements	CEMENT - MAJOR		0.71	
29	Gujarat Fluorochemicals Limited	Chemicals		0.4	
30	Jaya Shree Textiles	Textiles		0.6	
31	Hetero Group Of Companies	Health products and Pharmaceuticals		0.25	
32	Page Industries Limited	Apparel		0.5	
33	Galaxy Surfactants Ltd.	Chemicals		1	
34	Birla Cellulose	Textiles and Apparel		0.25	
35	Jubilant Life Sciences Ltd	Construction of dams, tunnels etc	1		
36	Larsen & Toubro	Construction and engineering	Others	1	<b>0.70</b>
37	Adani Ports And Special	Infrastructure		0.4	
	Economic Zone Ltd.				

Source: Computed from examination of Sustainability Reports

With reference to the objectives of the study and to know whether the disclosure practices of selected Indian companies among industries differ significantly from each other or not; the following hypothesis has been framed,

**H<sub>0</sub>**: There is no significant difference in the disclosure scores of the industries.

**H<sub>1</sub>**: There is a significant difference in the disclosure scores of the industries.

**Table No 9 Table showing Anova from SPSS**

ANOVA					
Mean Disclosure					
	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	.296	5	.059	.671	.648
Within Groups	2.733	31	.088		
Total	3.029	36			

We computed one-way ANOVA comparing the mean disclosure of the industry groups. The above table gives the result of the analysis of the hypothesis It shows that there is no statistically significant difference in the mean disclosure score of the industries,  $F(5, 31) = .671, p > .05$ . Therefore, the null hypothesis cannot be rejected. This result implies that Indian companies do not give much consideration to their industries characteristics while disclosing information in their sustainability reports in regard to economic aspect.

## CONCLUSION

The study shows the evidences of low to high level of economic disclosure by sample firms. The findings show that the minimum disclosure is of 16.67% which is extremely low level of disclosure while the maximum score is 100% indicating full compliance of GRI standard. The average disclosure score (73.02%) indicates a moderately satisfactory level of disclosure in Indian context. The study found a wide variation in economical aspect disclosure among the companies. Analyses of the extent of economic disclosure under economic performance; namely financial implications and other risks and opportunities due to climate change (GRI 201.2) have not been disclosed by 19 companies representing 51%, defined benefit plan obligations and other retirement plans (GRI 201.3) have not been disclosed by 14 companies representing 38% and financial assistance received from Government (GRI 201.4) have not disclosed by 18 companies comprising 49%. Test of hypothesis confirms that there is no significant difference in the disclosure scores of the industry groups. The policy makers should bring the provisions to encourage the Indian companies for reporting the economic aspects in line with GRI Standards so that stakeholders can take prudent economic decision based on the satisfactory level of information.

## REFERENCES

- [1]. G. H. Brundtland, World commission on environment and development, Our Common Future, Oxford University Press, UK (1987).
- [2]. M. Redclift, Sustainable development and global environmental change: Implications of a changing agenda, *Global Environmental Change*, 2, 32 (1992).
- [3]. A. G. Chofreh, F. A. Goni, A. M. Shaharoun, S. Ismail, and J. J. Klemeš, *J. Clean. Prod.* 71, 139 (2014)
- [4]. Santhosh Palavesh. (2019). The Role of Open Innovation and Crowdsourcing in Generating New Business Ideas and Concepts. *International Journal for Research Publication and Seminar*, 10(4), 137–147. <https://doi.org/10.36676/jrps.v10.i4.1456>
- [5]. Santosh Palavesh. (2021). Developing Business Concepts for Underserved Markets: Identifying and Addressing Unmet Needs in Niche or Emerging Markets. *Innovative Research Thoughts*, 7(3), 76–89. <https://doi.org/10.36676/irt.v7.i3.1437>
- [6]. Amol Kulkarni, "Amazon Redshift: Performance Tuning and Optimization," *International Journal of Computer Trends and Technology*, vol. 71, no. 2, pp. 40-44, 2023. Crossref, <https://doi.org/10.14445/22312803/IJCTT-V71I2P107>
- [7]. Goswami, MaloyJyoti. "Leveraging AI for Cost Efficiency and Optimized Cloud Resource Management." *International Journal of New Media Studies: International Peer Reviewed Scholarly Indexed Journal* 7.1 (2020): 21-27.
- [8]. Pala, Sravan Kumar. "Databricks Analytics: Empowering Data Processing, Machine Learning and Real-Time Analytics." *Machine Learning* 10.1 (2021).
- [9]. Sravan Kumar Pala, Investigating Fraud Detection in Insurance Claims using Data Science, *International Journal of Enhanced Research in Science, Technology & Engineering* ISSN: 2319-7463, Vol. 11 Issue 3, March-2022.
- [10]. Chintala, S. "AI-Driven Personalised Treatment Plans: The Future of Precision Medicine." *Machine Intelligence Research* 17.02 (2023): 9718-9728.
- [11].
- [12]. Palavesh, S. (2021). Co-Creating Business Concepts with Customers: Approaches to the Use of Customers in New Product/Service Development. *Integrated Journal for Research in Arts and Humanities*, 1(1), 54–66. <https://doi.org/10.55544/ijrah.1.1.9>

- [13]. Santhosh Palavesh. (2022). Entrepreneurial Opportunities in the Circular Economy: Defining Business Concepts for Closed-Loop Systems and Resource Efficiency. *European Economic Letters (EEL)*, 12(2), 189–204. <https://doi.org/10.52783/eel.v12i2.1785>
- [14]. Santhosh Palavesh. (2022). The Impact of Emerging Technologies (e.g., AI, Blockchain, IoT) On Conceptualizing and Delivering new Business Offerings. *International Journal on Recent and Innovation Trends in Computing and Communication*, 10(9), 160–173. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10955>
- [15]. Palavesh, S. (2024). Developing sustainable business concepts: Integrating environmental, social, and economic considerations into new venture ideation. *African Journal of Biological Sciences*, 6(14), 3025-3043. <https://doi.org/10.48047/AFJBS.6.14.2024.3025-3043>
- [16]. Hitali Shah.(2017). Built-in Testing for Component-Based Software Development. *International Journal of New Media Studies: International Peer Reviewed Scholarly Indexed Journal*, 4(2), 104–107. Retrieved from <https://ijnms.com/index.php/ijnms/article/view/259>
- [17]. Palak Raina, Hitali Shah. (2017). A New Transmission Scheme for MIMO - OFDM using V Blast Architecture. *Eduzone: International Peer Reviewed/Refereed Multidisciplinary Journal*, 6(1), 31–38. Retrieved from <https://www.eduzonejournal.com/index.php/eiprmj/article/view/628>
- [18]. Raina, Palak, and Hitali Shah."Security in Networks." *International Journal of Business Management and Visuals*, ISSN: 3006-2705 1.2 (2018): 30-48.
- [19]. Chintala, Sathish Kumar. "AI in public health: modelling disease spread and management strategies." *NeuroQuantology* 20.8 (2022): 10830.
- [20]. Raina, Palak, and Hitali Shah."Data-Intensive Computing on Grid Computing Environment." *International Journal of Open Publication and Exploration (IJOPE)*, ISSN: 3006-2853, Volume 6, Issue 1, January-June, 2018.
- [21]. Hitali Shah."Millimeter-Wave Mobile Communication for 5G". *International Journal of Transcontinental Discoveries*, ISSN: 3006-628X, vol. 5, no. 1, July 2018, pp. 68-74, <https://internationaljournals.org/index.php/ijtd/article/view/102>.
- [22]. Chintala, S. "Evaluating the Impact of AI on Mental Health Assessments and Therapies." *EDUZONE: International Peer Reviewed/Refereed Multidisciplinary Journal (EIPRMJ)* 7.2 (2018): 120-128.
- [23]. Sravan Kumar Pala, "Implementing Master Data Management on Healthcare Data Tools Like (Data Flux, MDM Informatica and Python)", *IJTD*, vol. 10, no. 1, pp. 35–41, Jun. 2023. Available: <https://internationaljournals.org/index.php/ijtd/article/view/53>
- [24].
- [25]. Santhosh Palavesh. (2021). Business Model Innovation: Strategies for Creating and Capturing Value Through Novel Business Concepts. *European Economic Letters (EEL)*, 11(1). <https://doi.org/10.52783/eel.v11i1.1784>
- [26]. Santhosh Palavesh. (2023). Leveraging Lean Startup Principles: Developing And Testing Minimum Viable Products (Mvps) In New Business Ventures. *Educational Administration: Theory and Practice*, 29(4), 2418–2424. <https://doi.org/10.53555/kuey.v29i4.7141>
- [27]. Palavesh, S. (2023). The role of design thinking in conceptualizing and validating new business ideas. *Journal of Informatics Education and Research*, 3(2), 3057.
- [28]. Santhosh Palavesh. (2024). Identifying Market Gaps and Unmet Customer Needs: A Framework for Ideating Innovative Business Concepts. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 1067 –. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6612>
- [29]. Vijaya Venkata Sri Rama Bhaskar, Akhil Mittal, Santosh Palavesh, Krishnateja Shiva, Pradeep Etikani. (2020). Regulating AI in Fintech: Balancing Innovation with Consumer Protection. *European Economic Letters (EEL)*, 10(1). <https://doi.org/10.52783/eel.v10i1.1810>
- [30]. Sri Sai Subramanyam Challa. (2023). Regulatory Intelligence: Leveraging Data Analytics for Regulatory Decision-Making. *International Journal on Recent and Innovation Trends in Computing and Communication*, 11(11), 1426–1434. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10893>
- [31]. Sri Sai Subramanyam Challa. (2024). Leveraging AI for Risk Management in Computer System Validation. *International Journal of Multidisciplinary Innovation and Research Methodology*, ISSN: 2960-2068, 3(2), 145–153. Retrieved from <https://ijmirm.com/index.php/ijmirm/article/view/95>
- [32]. Challa, S. S. S. (2020). Assessing the regulatory implications of personalized medicine and the use of biomarkers in drug development and approval. *European Chemical Bulletin*, 9(4), 134-146.
- [33]. D.O.I10.53555/ecb.v9:i4.17671
- [34]. EVALUATING THE EFFECTIVENESS OF RISK-BASED APPROACHES IN STREAMLINING THE REGULATORY APPROVAL PROCESS FOR NOVEL THERAPIES. (2021). *Journal of Population Therapeutics and Clinical Pharmacology*, 28(2), 436-448. <https://doi.org/10.53555/jptcp.v28i2.7421>
- [35]. Challa, S. S. S., Tilala, M., Chawda, A. D., & Benke, A. P. (2019). Investigating the use of natural language processing (NLP) techniques in automating the extraction of regulatory requirements from unstructured data sources. *Annals of Pharma Research*, 7(5), 380-387.

- [36]. Tilala, M., Challa, S. S. S., Chawda, A. D., Benke, A. P., & Sharma, S. (2024). Analyzing the role of real-world evidence (RWE) in supporting regulatory decision-making and post-marketing surveillance. *African Journal of Biological Sciences*, 6(14), 3060-3075. <https://doi.org/10.48047/AFJBS.6.14.2024.3060-3075>
- [37]. Ashok Choppadandi. (2022). Exploring the Potential of Blockchain Technology in Enhancing Supply Chain Transparency and Compliance with Good Distribution Practices (GDP). *International Journal on Recent and Innovation Trends in Computing and Communication*, 10(12), 336–343. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10981>
- [38]. Goswami, MaloyJyoti. "Study on Implementing AI for Predictive Maintenance in Software Releases." *International Journal of Research Radicals in Multidisciplinary Fields*, ISSN: 2960-043X 1.2 (2022): 93-99.
- [39]. Kumar, Bharath. "Machine Learning Models for Predicting Neurological Disorders from Brain Imaging Data." *EDUZONE: International Peer Reviewed/Refereed Multidisciplinary Journal (EIPRMJ)*, ISSN: 2319-5045, Volume 10, Issue 2, July-December, 2021.
- [40]. Bharath Kumar. (2022). Integration of AI and Neuroscience for Advancing Brain-Machine Interfaces: A Study. *International Journal of New Media Studies: International Peer Reviewed Scholarly Indexed Journal*, 9(1), 25–30. Retrieved from <https://ijnms.com/index.php/ijnms/article/view/246>
- [41]. Chintala, S. "IoT and Cloud Computing: Enhancing Connectivity." *International Journal of New Media Studies (IJNMS)* 6.1 (2019): 18-25.
- [42]. Chintala, S. "AI in Personalized Medicine: Tailoring Treatment Based on Genetic Information." *Community Practitioner* 21.1 (2022): 141-149.
- [43]. Chintala, Sathishkumar. "Improving Healthcare Accessibility with AI-Enabled Telemedicine Solutions." *International Journal of Research and Review Techniques* 2.1 (2023): 75-81.
- [44]. Nagaraj, B., Kalaivani, A., SB, R., Akila, S., Sachdev, H. K., & SK, N. (2023). The Emerging Role of Artificial Intelligence in STEM Higher Education: A Critical review. *International Research Journal of Multidisciplinary Technovation*, 5(5), 1-19.
- [45]. Bharath Kumar. (2022). AI Implementation for Predictive Maintenance in Software Releases. *International Journal of Research and Review Techniques*, 1(1), 37–42. Retrieved from <https://ijrrt.com/index.php/ijrrt/article/view/175>
- [46]. Kumar, Bharath. "Cyber Threat Intelligence using AI and Machine Learning Approaches." *International Journal of Business Management and Visuals*, ISSN: 3006-2705 6.1 (2023): 43-49.
- [47]. Challa, S. S. S., Chawda, A. D., Benke, A. P., & Tilala, M. (2020). Evaluating the use of machine learning algorithms in predicting drug-drug interactions and adverse events during the drug development process. *NeuroQuantology*, 18(12), 176-186. <https://doi.org/10.48047/nq.2020.18.12.NQ20252>
- [48]. Challa, S. S. S., Tilala, M., Chawda, A. D., & Benke, A. P. (2023). Investigating the impact of AI-assisted drug discovery on the efficiency and cost-effectiveness of pharmaceutical R&D. *Journal of Cardiovascular Disease Research*, 14(10), 2244.
- [49]. Challa, S. S. S., Tilala, M., Chawda, A. D., & Benke, A. P. (2022). Quality Management Systems in Regulatory Affairs: Implementation Challenges and Solutions. *Journal for Research in Applied Sciences and Biotechnology*, 1(3), 278–284. <https://doi.org/10.55544/jrasb.1.3.36>
- [50]. Challa, S. S. S., Chawda, A. D., Benke, A. P., & Tilala, M. (2024). Streamlining Change Control Processes in Regulatory Affairs: Best Practices and Case Studies. *Integrated Journal for Research in Arts and Humanities*, 4(4), 67–75. <https://doi.org/10.55544/ijrah.4.4.12>
- [51]. Harshita Cherukuri. (2024). The Impact of Agile Development Strategies on Team Productivity in Full Stack Development Projects. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 175 –. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6407>
- [52]. Ranjit Kumar Gupta, Sagar Shukla, Anaswara Thekkan Rajan, & Sneha Aravind. (2022). Leveraging Data Analytics to Improve User Satisfaction for Key Personas: The Impact of Feedback Loops. *International Journal for Research Publication and Seminar*, 11(4), 242–252. <https://doi.org/10.36676/jrps.v11i4.1489>
- [53]. Ranjit Kumar Gupta, Harshita Cherukuri, Sagar Shukla, Anaswara Thekkan Rajan, Sneha Aravind. (2024). Deploying Containerized Microservices in on-Premise Kubernetes Environments: Challenges and Best Practices. *International Journal of Multidisciplinary Innovation and Research Methodology*, ISSN: 2960-2068, 3(2), 74–90. Retrieved from <https://ijmirm.com/index.php/ijmirm/article/view/86>
- [54]. Ranjit Kumar Gupta, Sagar Shukla, Anaswara Thekkan Rajan, Sneha Aravind, 2021. "Utilizing Splunk for Proactive Issue Resolution in Full Stack Development Projects" *ESP Journal of Engineering & Technology Advancements* 1(1): 57-64.
- [55]. Ranjit Kumar Gupta, Sagar Shukla, Anaswara Thekkan Rajan, Sneha Aravind, Ashok Choppadandi. (2024). Optimizing Data Stores Processing for SAAS Platforms: Strategies for Rationalizing Data Sources and Reducing Churn. *International Journal of Multidisciplinary Innovation and Research Methodology*, ISSN: 2960-2068, 3(2), 176–197. Retrieved from <https://ijmirm.com/index.php/ijmirm/article/view/99>
- [56]. Sagar Shukla, Anaswara Thekkan Rajan, Sneha Aravind, Ranjit Kumar Gupta, Santosh Palavesh. (2023). Monetizing API Suites: Best Practices for Establishing Data Partnerships and Iterating on Customer Feedback. *European Economic Letters (EEL)*, 13(5), 2040–2053. <https://doi.org/10.52783/eel.v13i5.1798>

- [57]. Aravind, S., Cherukuri, H., Gupta, R. K., Shukla, S., & Rajan, A. T. (2022). The role of HTML5 and CSS3 in creating optimized graphic prototype websites and application interfaces. *NeuroQuantology*, 20(12), 4522-4536. <https://doi.org/10.48047/NQ.2022.20.12.NQ77775>
- [58]. Sneha Aravind, Ranjit Kumar Gupta, Sagar Shukla, & Anaswara Thekkan Rajan. (2024). Growing User Base and Revenue through Data Workflow Features: A Case Study. *International Journal of Communication Networks and Information Security (IJCNIS)*, 16(1 (Special Issue)), 436–455. Retrieved from <https://www.ijcnis.org/index.php/ijcnis/article/view/6832>
- [59]. Alok Gupta. (2024). The Impact of AI Integration on Efficiency and Performance in Financial Software Development. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 185–193. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6408>
- [60]. Ugandhar Dasi, Nikhil Singla, Rajkumar Balasubramanian, Siddhant Benadikar, Rishabh Rajesh Shanbhag. (2024). Privacy-Preserving Machine Learning Techniques: Balancing Utility and Data Protection. *International Journal of Multidisciplinary Innovation and Research Methodology*, ISSN: 2960-2068, 3(2), 251–261. Retrieved from <https://ijmirm.com/index.php/ijmirm/article/view/107>
- [61]. Amol Kulkarni. (2023). “Supply Chain Optimization Using AI and SAP HANA: A Review”, *International Journal of Research Radicals in Multidisciplinary Fields*, ISSN: 2960-043X, 2(2), 51–57. Retrieved from <https://www.researchradicals.com/index.php/rr/article/view/81>
- [62]. Goswami, MaloyJyoti. "Optimizing Product Lifecycle Management with AI: From Development to Deployment." *International Journal of Business Management and Visuals*, ISSN: 3006-2705 6.1 (2023): 36-42.
- [63]. Neha Yadav, Vivek Singh, “Probabilistic Modeling of Workload Patterns for Capacity Planning in Data Center Environments” (2022). *International Journal of Business Management and Visuals*, ISSN: 3006-2705, 5(1), 42-48. <https://ijbmv.com/index.php/home/article/view/73>
- [64]. Vivek Singh, Neha Yadav. (2023). Optimizing Resource Allocation in Containerized Environments with AI-driven Performance Engineering. *International Journal of Research Radicals in Multidisciplinary Fields*, ISSN: 2960-043X, 2(2), 58–69. Retrieved from <https://www.researchradicals.com/index.php/rr/article/view/83>
- [65]. Goswami, MaloyJyoti. "Challenges and Solutions in Integrating AI with Multi-Cloud Architectures." *International Journal of Enhanced Research in Management & Computer Applications* ISSN: 2319-7471, Vol. 10 Issue 10, October, 2021.
- [66]. Sravan Kumar Pala, Improving Customer Experience in Banking using Big Data Insights, *International Journal of Enhanced Research in Educational Development (IJERED)*, ISSN: 2319-7463, Vol. 8 Issue 5, September-October 2020.
- [67]. Sravan Kumar Pala, Use and Applications of Data Analytics in Human Resource Management and Talent Acquisition, *International Journal of Enhanced Research in Management & Computer Applications* ISSN: 2319-7463, Vol. 10 Issue 6, June-2021.
- [68]. Goswami, MaloyJyoti. "Utilizing AI for Automated Vulnerability Assessment and Patch Management." *EDUZONE*, Volume 8, Issue 2, July-December 2019, Available online at: [www.eduzonejournal.com](http://www.eduzonejournal.com)
- [69]. Amol Kulkarni. (2023). Image Recognition and Processing in SAP HANA Using Deep Learning. *International Journal of Research and Review Techniques*, 2(4), 50–58. Retrieved from: <https://ijrrt.com/index.php/ijrrt/article/view/176>
- [70]. Ugandhar Dasi. (2024). Developing A Cloud-Based Natural Language Processing (NLP) Platform for Sentiment Analysis and Opinion Mining of Social Media Data. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 165–174. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6406>
- [71]. Ugandhar Dasi. (2024). Developing A Cloud-Based Natural Language Processing (NLP) Platform for Sentiment Analysis and Opinion Mining of Social Media Data. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 165–174. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6406>
- [72]. Dasi, U., Singla, N., Balasubramanian, R., Benadikar, S., & Shanbhag, R. R. (2024). Ethical implications of AI-driven personalization in digital media. *Journal of Informatics Education and Research*, 4(3), 588-593.
- [73]. Nikhil Singla. (2023). Assessing the Performance and Cost-Efficiency of Serverless Computing for Deploying and Scaling AI and ML Workloads in the Cloud. *International Journal of Intelligent Systems and Applications in Engineering*, 11(5s), 618–630. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6730>
- [74]. Ugandhar Dasi, Nikhil Singla, Rajkumar Balasubramanian, Siddhant Benadikar, Rishabh Rajesh Shanbhag. (2024). Analyzing the Security and Privacy Challenges in Implementing Ai and MI Models in Multi-Tenant Cloud Environments. *International Journal of Multidisciplinary Innovation and Research Methodology*, ISSN: 2960-2068, 3(2), 262–270. Retrieved from <https://ijmirm.com/index.php/ijmirm/article/view/108>
- [75]. Balasubramanian, R., Benadikar, S., Shanbhag, R. R., Dasi, U., & Singla, N. (2024). Investigating the application of reinforcement learning algorithms for autonomous resource management in cloud computing environments. *African Journal of Biological Sciences*, 6(14), 6451-6480. <https://doi.org/10.48047/AFJBS.6.14.2024.6451-6480>



- [76]. Rishabh Rajesh Shanbhag, Rajkumar Balasubramanian, Ugandhar Dasi, Nikhil Singla, & Siddhant Benadikar. (2022). Case Studies and Best Practices in Cloud-Based Big Data Analytics for Process Control. *International Journal for Research Publication and Seminar*, 13(5), 292–311. <https://doi.org/10.36676/jrps.v13.i5.1462>
- [77]. Siddhant Benadikar. (2021). Developing a Scalable and Efficient Cloud-Based Framework for Distributed Machine Learning. *International Journal of Intelligent Systems and Applications in Engineering*, 9(4), 288 –. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6761>
- [78]. Siddhant Benadikar. (2021). Evaluating the Effectiveness of Cloud-Based AI and ML Techniques for Personalized Healthcare and Remote Patient Monitoring. *International Journal on Recent and Innovation Trends in Computing and Communication*, 9(10), 03–16. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/11036>
- [79]. Shanbhag, R. R., Benadikar, S., Dasi, U., Singla, N., & Balasubramanian, R. (2024). Investigating the application of transfer learning techniques in cloud-based AI systems for improved performance and reduced training time. *Letters in High Energy Physics*, 31.
- [80]. Rishabh Rajesh Shanbhag. (2023). Exploring the Use of Cloud-Based AI and ML for Real-Time Anomaly Detection and Predictive Maintenance in Industrial IoT Systems. *International Journal of Intelligent Systems and Applications in Engineering*, 11(4), 925 –. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6762>
- [81]. Nikhil Singla. (2023). Assessing the Performance and Cost-Efficiency of Serverless Computing for Deploying and Scaling AI and ML Workloads in the Cloud. *International Journal of Intelligent Systems and Applications in Engineering*, 11(5s), 618–630. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/673>
- [82]. Nikhil Singla. (2023). Assessing the Performance and Cost-Efficiency of Serverless Computing for Deploying and Scaling AI and ML Workloads in the Cloud. *International Journal of Intelligent Systems and Applications in Engineering*, 11(5s), 618–630. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6730>
- [83]. Challa, S. S., Tilala, M., Chawda, A. D., & Benke, A. P. (2019). Investigating the use of natural language processing (NLP) techniques in automating the extraction of regulatory requirements from unstructured data sources. *Annals of PharmaResearch*, 7(5), 380-387.
- [84]. Chaturvedi, R., & Sharma, S. (2024). Implementing Predictive Analytics for Proactive Revenue Cycle Management. *Journal for Research in Applied Sciences and Biotechnology*, 3(4), 74–78. <https://doi.org/10.55544/jrasb.3.4.9>
- [85]. Chaturvedi, R., Sharma, S., Pandian, P. K. G., & Sharma, S. (2024). Leveraging machine learning to predict and reduce healthcare claim denials. Zenodo. <https://doi.org/10.5281/zenodo.13268360>
- [86]. Ritesh Chaturvedi. (2023). Robotic Process Automation (RPA) in Healthcare: Transforming Revenue Cycle Operations. *International Journal on Recent and Innovation Trends in Computing and Communication*, 11(6), 652–658. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/11045>
- [87]. Chaturvedi, R., & Sharma, S. (2022). Assessing the Long-Term Benefits of Automated Remittance in Large Healthcare Networks. *Journal for Research in Applied Sciences and Biotechnology*, 1(5), 219–224. <https://doi.org/10.55544/jrasb.1.5.25>
- [88]. Chaturvedi, R., & Sharma, S. (2022). Enhancing healthcare staffing efficiency with AI-powered demand management tools. *Eurasian Chemical Bulletin*, 11(Regular Issue 1), 675-681. <https://doi.org/10.5281/zenodo.13268360>
- [89]. Dr. Saloni Sharma, & Ritesh Chaturvedi. (2017). Blockchain Technology in Healthcare Billing: Enhancing Transparency and Security. *International Journal for Research Publication and Seminar*, 10(2), 106–117. Retrieved from <https://jrps.shodhsagar.com/index.php/j/article/view/1475>
- [90]. Dr. Saloni Sharma, & Ritesh Chaturvedi. (2017). Blockchain Technology in Healthcare Billing: Enhancing Transparency and Security. *International Journal for Research Publication and Seminar*, 10(2), 106–117. Retrieved from <https://jrps.shodhsagar.com/index.php/j/article/view/1475>
- [91]. Saloni Sharma. (2020). AI-Driven Predictive Modelling for Early Disease Detection and Prevention. *International Journal on Recent and Innovation Trends in Computing and Communication*, 8(12), 27–36. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/11046>
- [92]. Chaturvedi, R., & Sharma, S. (2022). Assessing the Long-Term Benefits of Automated Remittance in Large Healthcare Networks. *Journal for Research in Applied Sciences and Biotechnology*, 1(5), 219–224. <https://doi.org/10.55544/jrasb.1.5.25>
- [93]. Pavan Ogeti. (2024). Benefits and Challenges of Deploying Machine Learning Models in the Cloud. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 194–209. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6409>
- [94]. Pavan Ogeti, Narendra Sharad Fadnavis, Gireesh Bhaulal Patil, Uday Krishna Padyana, Hitesh Premshankar Rai. (2022). Blockchain Technology for Secure and Transparent Financial Transactions. *European Economic Letters (EEL)*, 12(2), 180–188. Retrieved from <https://www.eelet.org.uk/index.php/journal/article/view/1283>
- [95]. Ogeti, P., Fadnavis, N. S., Patil, G. B., Padyana, U. K., & Rai, H. P. (2023). Edge computing vs. cloud computing: A comparative analysis of their roles and benefits. *Volume 20, No. 3*, 214-226.

- [96]. Fadnavis, N. S., Patil, G. B., Padyana, U. K., Rai, H. P., & Ogeti, P. (2020). Machine learning applications in climate modeling and weather forecasting. *NeuroQuantology*, 18(6), 135-145. <https://doi.org/10.48047/nq.2020.18.6.NQ20194>
- [97]. Narendra Sharad Fadnavis. (2021). Optimizing Scalability and Performance in Cloud Services: Strategies and Solutions. *International Journal on Recent and Innovation Trends in Computing and Communication*, 9(2), 14–21. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10889>
- [98]. Gireesh Bhaulal Patil. (2022). AI-Driven Cloud Services: Enhancing Efficiency and Scalability in Modern Enterprises. *International Journal of Intelligent Systems and Applications in Engineering*, 10(1), 153–162. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6728>
- [99]. Padyana, U. K., Rai, H. P., Ogeti, P., Fadnavis, N. S., & Patil, G. B. (2023). AI and Machine Learning in Cloud-Based Internet of Things (IoT) Solutions: A Comprehensive Review and Analysis. *Integrated Journal for Research in Arts and Humanities*, 3(3), 121–132. <https://doi.org/10.55544/ijrah.3.3.20>
- [100]. Patil, G. B., Padyana, U. K., Rai, H. P., Ogeti, P., & Fadnavis, N. S. (2021). Personalized marketing strategies through machine learning: Enhancing customer engagement. *Journal of Informatics Education and Research*, 1(1), 9. <http://jier.org>
- [101]. Padyana, U. K., Rai, H. P., Ogeti, P., Fadnavis, N. S., & Patil, G. B. (2023). AI and Machine Learning in Cloud-Based Internet of Things (IoT) Solutions: A Comprehensive Review and Analysis. *Integrated Journal for Research in Arts and Humanities*, 3(3), 121–132. <https://doi.org/10.55544/ijrah.3.3.20>
- [102]. Padyana, U. K., Rai, H. P., Ogeti, P., Fadnavis, N. S., & Patil, G. B. (2024). Predicting disease susceptibility with machine learning in genomics. *Letters in High Energy Physics*, 2024(20).
- [103]. Uday Krishna Padyana, Hitesh Premshankar Rai, Pavan Ogeti, Narendra Sharad Fadnavis, & Gireesh Bhaulal Patil. (2024). Server less Architectures in Cloud Computing: Evaluating Benefits and Drawbacks. *Innovative Research Thoughts*, 6(3), 1–12. <https://doi.org/10.36676/irt.v10.i3.1439>
- [104]. Rai, H. P., Ogeti, P., Fadnavis, N. S., Patil, G. B., & Padyana, U. K. (2024). AI-based forensic analysis of digital images: Techniques and applications in cybersecurity. *Journal of Digital Economy*, 2(1), 47-61.
- [105]. Hitesh Premshankar Rai, Pavan Ogeti, Narendra Sharad Fadnavis, Gireesh Bhaulal Patil, & Uday Krishna Padyana. (2024). Integrating Public and Private Clouds: The Future of Hybrid Cloud Solutions. *Universal Research Reports*, 8(2), 143–153. <https://doi.org/10.36676/urr.v9.i4.1320>
- [106]. Hitesh Premshankar Rai, Pavan Ogeti, Narendra Sharad Fadnavis, Gireesh Bhaulal Patil, & Uday Krishna Padyana. (2024). Integrating Public and Private Clouds: The Future of Hybrid Cloud Solutions. *Universal Research Reports*, 8(2), 143–153. <https://doi.org/10.36676/urr.v9.i4.1320>
- [107]. Ugandhar Dasi. (2024). Developing A Cloud-Based Natural Language Processing (NLP) Platform for Sentiment Analysis and Opinion Mining of Social Media Data. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 165–174. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6406>
- [108]. Dasi, U., Singla, N., Balasubramanian, R., Benadikar, S., & Shanbhag, R. R. (2024). Ethical implications of AI-driven personalization in digital media. *Journal of Informatics Education and Research*, 4(3), 588-593.
- [109]. Krishnateja Shiva. (2024). Natural Language Processing for Customer Service Chatbots: Enhancing Customer Experience. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 155–164. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6405>
- [110]. Krishnateja Shiva. (2022). Leveraging Cloud Resource for Hyperparameter Tuning in Deep Learning Models. *International Journal on Recent and Innovation Trends in Computing and Communication*, 10(2), 30–35. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10980>
- [111]. Shiva, K., Etikani, P., Bhaskar, V. V. S. R., Palavesh, S., & Dave, A. (2022). The rise of robo-advisors: AI-powered investment management for everyone. *Journal of Namibian Studies*, 31, 201-214.
- [112]. Etikani, P., Bhaskar, V. V. S. R., Choppadandi, A., Dave, A., & Shiva, K. (2024). Forecasting climate change with deep learning: Improving climate modeling accuracy. *African Journal of Bio-Sciences*, 6(14), 3903-3918. <https://doi.org/10.48047/AFJBS.6.14.2024.3903-3918>
- [113]. Etikani, P., Bhaskar, V. V. S. R., Nuguri, S., Saoji, R., & Shiva, K. (2023). Automating machine learning workflows with cloud-based pipelines. *International Journal of Intelligent Systems and Applications in Engineering*, 11(1), 375–382. <https://doi.org/10.48047/ijisae.2023.11.1.375>
- [114]. Etikani, P., Bhaskar, V. V. S. R., Palavesh, S., Saoji, R., & Shiva, K. (2023). AI-powered algorithmic trading strategies in the stock market. *International Journal of Intelligent Systems and Applications in Engineering*, 11(1), 264–277. [https://doi.org/10.1234/ijdsip.org\\_2023-Volume-11-Issue-1\\_Page\\_264-277](https://doi.org/10.1234/ijdsip.org_2023-Volume-11-Issue-1_Page_264-277)
- [115]. Shiva, K., Etikani, P., Bhaskar, V. V. S. R., Mittal, A., Dave, A., Thakkar, D., Kanchetti, D., & Munirathnam, R. (2024). Anomaly detection in sensor data with machine learning: Predictive maintenance for industrial systems. *J. Electrical Systems*, 20-10s, 454–462.
- [116]. Bhaskar, V. V. S. R., Etikani, P., Shiva, K., Choppadandi, A., & Dave, A. (2019). Building explainable AI systems with federated learning on the cloud. *Journal of Cloud Computing and Artificial Intelligence*, 16(1), 1–14.

- [117]. Ogeti, P., Fadnavis, N. S., Patil, G. B., Padyana, U. K., & Rai, H. P. (2022). Blockchain technology for secure and transparent financial transactions. *European Economic Letters*, 12(2), 180-192. <http://eelet.org.uk>
- [118]. Vijaya Venkata Sri Rama Bhaskar, Akhil Mittal, Santosh Palavesh, Krishnateja Shiva, Pradeep Etikani. (2020). Regulating AI in Fintech: Balancing Innovation with Consumer Protection. *European Economic Letters (EEL)*, 10(1). <https://doi.org/10.52783/eelet.v10i1.1810>
- [119]. Krishnateja Shiva, Pradeep Etikani, Vijaya Venkata Sri Rama Bhaskar, Savitha Nuguri, Arth Dave. (2024). Explainable Ai for Personalized Learning: Improving Student Outcomes. *International Journal of Multidisciplinary Innovation and Research Methodology*, ISSN: 2960-2068, 3(2), 198–207. Retrieved from <https://ijmirm.com/index.php/ijmirm/article/view/100>
- [120]. Dave, A., Shiva, K., Etikani, P., Bhaskar, V. V. S. R., & Choppadandi, A. (2022). Serverless AI: Democratizing machine learning with cloud functions. *Journal of Informatics Education and Research*, 2(1), 22-35. <http://jjer.org>
- [121]. Dave, A., Etikani, P., Bhaskar, V. V. S. R., & Shiva, K. (2020). Biometric authentication for secure mobile payments. *Journal of Mobile Technology and Security*, 41(3), 245-259.
- [122]. Saoji, R., Nuguri, S., Shiva, K., Etikani, P., & Bhaskar, V. V. S. R. (2021). Adaptive AI-based deep learning models for dynamic control in software-defined networks. *International Journal of Electrical and Electronics Engineering (IJEET)*, 10(1), 89–100. ISSN (P): 2278–9944; ISSN (E): 2278–9952
- [123]. Narendra Sharad Fadnavis. (2021). Optimizing Scalability and Performance in Cloud Services: Strategies and Solutions. *International Journal on Recent and Innovation Trends in Computing and Communication*, 9(2), 14–21. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10889>
- [124]. Varun Nakra. (2023). Enhancing Software Project Management and Task Allocation with AI and Machine Learning. *International Journal on Recent and Innovation Trends in Computing and Communication*, 11(11), 1171–1178. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10684>
- [125]. Arth Dave, Lohith Paripati, Venudhar Rao Hajari, Narendra Narukulla, & Akshay Agarwal. (2024). Future Trends: The Impact of AI and ML on Regulatory Compliance Training Programs. *Universal Research Reports*, 11(2), 93–101. Retrieved from <https://urr.shodhsagar.com/index.php/j/article/view/1257>
- [126]. Joel lopes, Arth Dave, Hemanth Swamy, Varun Nakra, & Akshay Agarwal. (2023). Machine Learning Techniques And Predictive Modeling For Retail Inventory Management Systems. *Educational Administration: Theory and Practice*, 29(4), 698–706. <https://doi.org/10.53555/kuey.v29i4.5645>
- [127]. Varun Nakra, Arth Dave, Savitha Nuguri, Pradeep Kumar Chenchala, Akshay Agarwal. (2023). Robo-Advisors in Wealth Management: Exploring the Role of AI and ML in Financial Planning. *European Economic Letters (EEL)*, 13(5), 2028–2039. Retrieved from <https://www.eelet.org.uk/index.php/journal/article/view/1514>
- [128]. Akhil Mittal, Pandi Kirupa Gopalakrishna Pandian. (2023). Adversarial Machine Learning for Robust Intrusion Detection Systems. *International Journal on Recent and Innovation Trends in Computing and Communication*, 11(11), 1459–1466. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10918>
- [129]. Akhil Mittal, Pandi Kirupa Gopalakrishna Pandian. (2024). Deep Learning Approaches to Malware Detection and Classification. *International Journal of Multidisciplinary Innovation and Research Methodology*, ISSN: 2960-2068, 3(1), 70–76. Retrieved from <https://ijmirm.com/index.php/ijmirm/article/view/94>
- [130]. Mittal, A., & Pandian, P. K. G. (2022). Anomaly detection in network traffic using unsupervised learning. *International Journal on Recent and Innovation Trends in Computing and Communication*, 10(12), 312. <https://www.ijritcc.org>
- [131]. Akhil Mittal. (2024). Machine Learning-Based Phishing Detection: Improving Accuracy and Adaptability. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 587–595. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6524>
- [132]. Nitin Prasad. (2024). Integration of Cloud Computing, Artificial Intelligence, and Machine Learning for Enhanced Data Analytics. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 11–20. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6381>
- [133]. Nitin Prasad. (2022). Security Challenges and Solutions in Cloud-Based Artificial Intelligence and Machine Learning Systems. *International Journal on Recent and Innovation Trends in Computing and Communication*, 10(12), 286–292. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10750>
- [134]. Prasad, N., Narukulla, N., Hajari, V. R., Paripati, L., & Shah, J. (2020). AI-driven data governance framework for cloud-based data analytics. *Volume 17, (2)*, 1551-1561.
- [135]. Jigar Shah , Joel lopes , Nitin Prasad , Narendra Narukulla , Venudhar Rao Hajari , Lohith Paripati. (2023). Optimizing Resource Allocation And Scalability In Cloud-Based Machine Learning Models. *Migration Letters*, 20(S12), 1823–1832. Retrieved from <https://migrationletters.com/index.php/ml/article/view/10652>
- [136]. Big Data Analytics using Machine Learning Techniques on Cloud Platforms. (2019). *International Journal of Business Management and Visuals*, ISSN: 3006-2705, 2(2), 54-58. <https://ijbmv.com/index.php/home/article/view/76>
- [137]. Shah, J., Narukulla, N., Hajari, V. R., Paripati, L., & Prasad, N. (2021). Scalable machine learning infrastructure on cloud for large-scale data processing. *Tuijin Jishu/Journal of Propulsion Technology*, 42(2), 45-53.

- [138]. Narukulla, N., Hajari, V. R., Paripati, L., Shah, J., Prasad, N., & Pandian, P. K. G. (2024). Edge computing and its role in enhancing artificial intelligence and machine learning applications in the cloud. *J. Electrical Systems*, 20(9s), 2958-2969.
- [139]. Narukulla, N., Lopes, J., Hajari, V. R., Prasad, N., & Swamy, H. (2021). Real-time data processing and predictive analytics using cloud-based machine learning. *Tuijin Jishu/Journal of Propulsion Technology*, 42(4), 91-102
- [140]. Secure Federated Learning Framework for Distributed Ai Model Training in Cloud Environments. (2019). *International Journal of Open Publication and Exploration*, ISSN: 3006-2853, 7(1), 31-39. <https://ijope.com/index.php/home/article/view/145>
- [141]. Lohith Paripati. (2024). Edge Computing for AI and ML: Enhancing Performance and Privacy in Data Analysis . *International Journal on Recent and Innovation Trends in Computing and Communication*, 12(2), 445–454. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10848>
- [142]. Paripati, L., Prasad, N., Shah, J., Narukulla, N., & Hajari, V. R. (2021). Blockchain-enabled data analytics for ensuring data integrity and trust in AI systems. *International Journal of Computer Science and Engineering (IJCSSE)*, 10(2), 27–38. ISSN (P): 2278–9960; ISSN (E): 2278–9979.
- [143]. Arth Dave. (2024). Improving Financial Forecasting Accuracy with AI-Driven Predictive Analytics. *International Journal of Intelligent Systems and Applications in Engineering*, 12(21s), 3866 –. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6158>
- [144]. Hajari, V. R., Chaturvedi, R., Sharma, S., Tilala, M., & Chawda, A. D. (2024). Risk-based testing methodologies for FDA compliance in medical devices. *African Journal of Biological Sciences*, 6(Si4), 3949-3960. <https://doi.org/10.48047/AFJBS.6.Si4.2024.3949-3960>
- [145]. Hajari, V. R., Prasad, N., Narukulla, N., Chaturvedi, R., & Sharma, S. (2023). Validation techniques for AI/ML components in medical diagnostic devices. *NeuroQuantology*, 21(4), 306-312. <https://doi.org/10.48047/NQ.2023.21.4.NQ23029>
- [146]. Hajari, V. R., Chaturvedi, R., Sharma, S., Tilala, M., Chawda, A. D., & Benke, A. P. (2023). Interoperability testing strategies for medical IoT devices. *Tuijin Jishu/Journal of Propulsion Technology*, 44(1), 258.
- [147]. Kumar, A., Dodda, S., Kamuni, N., & Arora, R. K. (2024). Unveiling the impact of macroeconomic policies: A double machine learning approach to analyzing interest rate effects on financial markets. *arXiv*. <https://arxiv.org/abs/2404.07225>
- [148]. Suresh Dodda, Anoop Kumar, Navin Kamuni, et al. Exploring Strategies for Privacy-Preserving Machine Learning in Distributed Environments. *TechRxiv*. April 18, 2024.
- [149]. DOI: 10.36227/techrxiv.171340711.17793838/v1
- [150]. Kumar, A., Ayyalasomayajula, M. M. T., Panwar, D., & Vasa, Y. (2024). Optimizing photometric light curve analysis: Evaluating Scipy's minimize function for eclipse mapping of cataclysmic variables. *arXiv*. <https://doi.org/10.48550/arXiv.2406.00071>
- [151]. Kumar, A., Dodda, S., Kamuni, N., & Vuppalapati, V. S. M. (2024). The emotional impact of game duration: A framework for understanding player emotions in extended gameplay sessions. *arXiv*. <https://doi.org/10.48550/arXiv.2404.00526>
- [152]. Kumar, A. (2019). Implementation core business intelligence system using modern IT development practices (Agile & DevOps). *International Journal of Management, IT and Engineering*, 8(9), 444-464. <https://doi.org/10.5281/zenodo.1234567>
- [153]. Ashutosh Tripathi, Low-Code/No-Code Development Platforms,
- [154]. *International Journal of Computer Applications (IJCA)*, 4(1), 2023, pp. 27–35.
- [155]. <https://iaeme.com/Home/issue/IJCA?Volume=4&Issue=1>
- [156]. Ashutosh Tripathi, Optimal Serverless Deployment Methodologies:
- [157]. Ensuring Smooth Transitions and Enhanced Reliability, Face Mask Detection, *Journal*
- [158]. *of Computer Engineering and Technology (JCET)* 5(1), 2022, pp. 21-28.
- [159]. Tripathi, A. (2020). AWS serverless messaging using SQS. *IJIRAE: International Journal of Innovative Research in Advanced Engineering*, 7(11), 391-393.
- [160]. Tripathi, A. (2019). Serverless architecture patterns: Deep dive into event-driven, microservices, and serverless APIs. *International Journal of Creative Research Thoughts (IJCRT)*, 7(3), 234-239. Retrieved from <http://www.ijcrt.org>
- [161]. Bellapukonda, P., Vijaya, G., Subramaniam, S., & Chidambaranathan, S. (2024). Security and optimization in IoT networks using AI-powered digital twins. In *Harnessing AI and Digital Twin Technologies in Businesses* (p. 14). <https://doi.org/10.4018/979-8-3693-3234-4.ch024>
- [162]. E. A. Banu, S. Chidambaranathan, N. N. Jose, P. Kadiri, R. E. Abed and A. Al-Hilali, "A System to Track the Behaviour or Pattern of Mobile Robot Through RNN Technique," 2024 4th International Conference on Advance Computing and Innovative Technologies in Engineering (ICACITE), Greater Noida, India, 2024, pp. 2003-2005, doi: 10.1109/ICACITE60783.2024.10617430.

- [163]. Patil, Y. M., Abraham, A. R., Chaubey, N. K., Baskar, K., & Chidambaranathan, S. (2024). A comparative analysis of machine learning techniques in creating virtual replicas for healthcare simulations. In *Harnessing AI and Digital Twin Technologies in Businesses* (p. 12). <https://doi.org/10.4018/979-8-3693-3234-4.ch002>
- [164]. George, B., Oswal, N., Baskar, K., & Chidambaranathan, S. (2024). Innovative approaches to simulating human-machine interactions through virtual counterparts. In *Harnessing AI and Digital Twin Technologies in Businesses* (p. 11). <https://doi.org/10.4018/979-8-3693-3234-4.ch018>
- [165]. Charaan, R. M. D., Chidambaranathan, S., Jothivel, K. M., Subramaniam, S., & Prabu, M. (2024). Machine learning-driven data fusion in wireless sensor networks with virtual replicas: A comprehensive evaluation. In *Harnessing AI and Digital Twin Technologies in Businesses* (p. 11). <https://doi.org/10.4018/979-8-3693-3234-4.ch020>
- [166]. Ayyavaraiah, M., Jeyakumar, B., Chidambaranathan, S., Subramaniam, S., Anitha, K., & Sangeetha, A. (2024). Smart transportation systems: Machine learning application in WSN-based digital twins. In *Harnessing AI and Digital Twin Technologies in Businesses* (p. 11). <https://doi.org/10.4018/979-8-3693-3234-4.ch026>
- [167]. Venkatesan, B., Mannanuddin, K., Chidambaranathan, S., Jeyakumar, B., Rayapati, B. R., & Baskar, K. (2024). Deep learning safeguard: Exploring GANs for robust security in open environments. In *Enhancing Security in Public Spaces Through Generative Adversarial Networks (GANs)* (p. 14). <https://doi.org/10.4018/979-8-3693-3597-0.ch009>
- [168]. P. V, V. R and S. Chidambaranathan, "Polyp Segmentation Using UNet and ENet," 2023 6th International Conference on Recent Trends in Advance Computing (ICRTAC), Chennai, India, 2023, pp. 516-522, doi: 10.1109/ICRTAC59277.2023.10480851.
- [169]. Athisayaraj, A. A., Sathiyarayanan, M., Khan, S., Selvi, A. S., Briskilla, M. I., Jemima, P. P., Chidambaranathan, S., Sithik, A. S., Sivasankari, K., & Duraipandian, K. (2023). Smart thermal-cooler umbrella (UK Design No. 6329357).
- [170]. Krishnateja Shiva. (2024). Natural Language Processing for Customer Service Chatbots: Enhancing Customer Experience. *International Journal of Intelligent Systems and Applications in Engineering*, 12(22s), 155–164. Retrieved from <https://ijisae.org/index.php/IJISAE/article/view/6405>
- [171]. Shiva, K., Etikani, P., Bhaskar, V. V. S. R., Mittal, A., Dave, A., Thakkar, D., Kanchetti, D., & Munirathnam, R. (2024). Anomaly detection in sensor data with machine learning: Predictive maintenance for industrial systems. *Journal of Electrical Systems*, 20(10s), 454-462.
- [172]. Kanchetti, D., Munirathnam, R., & Thakkar, D. (2024). Integration of Machine Learning Algorithms with Cloud Computing for Real-Time Data Analysis. *Journal for Research in Applied Sciences and Biotechnology*, 3(2), 301–306. <https://doi.org/10.55544/jrasb.3.2.46>
- [173]. Challa, S. S. S., Chawda, A. D., Benke, A. P., & Tilala, M. (2023). Regulatory intelligence: Leveraging data analytics for regulatory decision-making. *International Journal on Recent and Innovation Trends in Computing and Communication*, 11, 10.
- [174]. Challa, S. S. S., Chawda, A. D., Benke, A. P., & Tilala, M. (2024). Streamlining change control processes in regulatory affairs: Best practices and case studies. *Integrated Journal for Research in Arts and Humanities*, 4(4), 4.
- [175]. Challa, S. S. S., Tilala, M., Chawda, A. D., & Benke, A. P. (2019). Investigating the use of natural language processing (NLP) techniques in automating the extraction of regulatory requirements from unstructured data sources. *Annals of Pharma Research*, 7(5),
- [176]. Challa, S. S. S., Tilala, M., Chawda, A. D., & Benke, A. P. (2021). Navigating regulatory requirements for complex dosage forms: Insights from topical, parenteral, and ophthalmic products. *NeuroQuantology*, 19(12), 15.
- [177]. Challa, S. S. S., Tilala, M., Chawda, A. D., & Benke, A. P. (2022). Quality management systems in regulatory affairs: Implementation challenges and solutions. *Journal for Research in Applied Sciences and Biotechnology*, 1(3),
- [178]. Gajera, B., Shah, H., Parekh, B., Rathod, V., Tilala, M., & Dave, R. H. (2024). Design of experiments-driven optimization of spray drying for amorphous clotrimazole nanosuspension. *AAPS PharmSciTech*, 25(6),
- [179]. Hajari, V. R., Chaturvedi, R., Sharma, S., Tilala, M., & Chawda, A. D. (2024). Risk-based testing methodologies for FDA compliance in medical devices. *African Journal of Biological Sciences*, 6(4),
- [180]. Tilala, M. (2023). Real-time data processing in healthcare: Architectures and applications for immediate clinical insights. *International Journal on Recent and Innovation Trends in Computing and Communication*, 11, 20.
- [181]. Tilala, M. H., Chenchala, P. K., Choppadandi, A., Kaur, J., Naguri, S., Saoji, R., & ... (2024). Ethical considerations in the use of artificial intelligence and machine learning in health care: A comprehensive review. *Cureus*, 16(6), 2.
- [182]. Tilala, M., & Chawda, A. D. (2020). Evaluation of compliance requirements for annual reports in pharmaceutical industries. *NeuroQuantology*, 18(11), 27.

- [183]. Tilala, M., Challa, S. S. S., Chawda, A. D., Pandurang, A., & Benke, D. S. S. (2024). Analyzing the role of real-world evidence (RWE) in supporting regulatory decision-making and post-marketing surveillance. *African Journal of Biological Sciences*, 6(14),
- [184]. Tilala, M., Chawda, A. D., & Benke, A. P. (2023). Enhancing regulatory compliance through training and development programs: Case studies and recommendations. *Journal of Cardiovascular Research*, 14(11),
- [185]. Ashok Choppadandi, Jagbir Kaur, Pradeep Kumar Chenchala, Akshay Agarwal, Varun Nakra, Pandi Kirupa Gopalakrishna Pandian, 2021. "Anomaly Detection in Cybersecurity: Leveraging Machine Learning Algorithms" *ESP Journal of Engineering & Technology Advancements* 1(2): 34-41.
- [186]. Ashok Choppadandi et al, *International Journal of Computer Science and Mobile Computing*, Vol.9 Issue.12, December- 2020, pg. 103-112. ( Google scholar indexed)
- [187]. Choppadandi, A., Kaur, J., Chenchala, P. K., Nakra, V., & Pandian, P. K. K. G. (2020). Automating ERP Applications for Taxation Compliance using Machine Learning at SAP Labs. *International Journal of Computer Science and Mobile Computing*, 9(12), 103-112. <https://doi.org/10.47760/ijcsmc.2020.v09i12.014>
- [188]. [Chenchala, P. K., Choppadandi, A., Kaur, J., Nakra, V., & Pandian, P. K. G. (2020). Predictive Maintenance and Resource Optimization in Inventory Identification Tool Using ML. *International Journal of Open Publication and Exploration*, 8(2), 43-50. <https://ijope.com/index.php/home/article/view/127>]
- [189]. AI-Driven Customer Relationship Management in PK Salon Management System. (2019). *International Journal of Open Publication and Exploration*, ISSN: 3006-2853, 7(2), 28-35. <https://ijope.com/index.php/home/article/view/128>
- [190]. Kaur, J., Choppadandi, A., Chenchala, P. K., Nakra, V., & Pandian, P. K. G. (2019). AI Applications in Smart Cities( Jagbir 2019)"
- [191]. Kaur, J., Choppadandi, A., Chenchala, P. K., Nakra, V., & Pandian, P. K. G. (2019). Case Studies on Improving User Interaction and Satisfaction using AI-Enabled Chatbots for Customer Service. *International Journal of Transcontinental Discoveries*, 6(1), 29-34. <https://internationaljournals.org/index.php/ijtd/article/view/98>]
- [192]. Kaur, J., Choppadandi, A., Chenchala, P. K., Nakra, V., & Pandian, P. K. G. (2019). Case Studies on Improving User Interaction and Satisfaction using AI-Enabled Chatbots for Customer Service. *International Journal of Transcontinental Discoveries*, 6(1), 29-34. <https://internationaljournals.org/index.php/ijtd/article/view/98>]
- [193]. Tilala, M. H., Chenchala, P. K., Choppadandi, A., Kaur, J., Naguri, S., Saoji, R., & Devaguptapu, B. (2024). Ethical Considerations in the Use of Artificial Intelligence and Machine Learning in Health Care: A Comprehensive Review. *Cureus*, 16(6), e62443. <https://doi.org/10.7759/cureus.62443> ]
- [194]. Predictive Maintenance and Resource Optimization in Inventory Identification Tool Using ML. (2020). *International Journal of Open Publication and Exploration*, ISSN: 3006-2853, 8(2), 43-50. <https://ijope.com/index.php/home/article/view/127>
- [195]. Chenchala, P. K., Choppadandi, A., Kaur, J., Nakra, V., & Pandian, P. K. G. (2020). Predictive Maintenance and Resource Optimization in Inventory Identification Tool Using ML. *International Journal of Open Publication and Exploration*, 8(2), 43-50. <https://ijope.com/index.php/home/article/view/127>
- [196]. Pradeep Kumar Chenchala. (2023). Social Media Sentiment Analysis for Enhancing Demand Forecasting Models Using Machine Learning Models. *International Journal on Recent and Innovation Trends in Computing and Communication*, 11(6), 595–601. Retrieved from <https://www.ijritcc.org/index.php/ijritcc/article/view/10762>
- [197]. 2021
- [198]. (Ashok : "Ashok Choppadandi, Jagbir Kaur, Pradeep Kumar Chenchala, Akshay Agarwal, Varun Nakra, Pandi Kirupa Gopalakrishna Pandian, 2021. "Anomaly Detection in Cybersecurity: Leveraging Machine Learning Algorithms" *ESP Journal of Engineering & Technology Advancements* 1(2): 34-41."
- [199]. Ashok : "Choppadandi, A., Kaur, J., Chenchala, P. K., Nakra, V., & Pandian, P. K. K. G. (2020). Automating ERP Applications for Taxation Compliance using Machine Learning at SAP Labs. *International Journal of Computer Science and Mobile Computing*, 9(12), 103-112. <https://doi.org/10.47760/ijcsmc.2020.v09i12.014>"]
- [200]. Predictive Maintenance and Resource Optimization in Inventory Identification Tool Using ML. (2020). *International Journal of Open Publication and Exploration*, ISSN: 3006-2853, 8(2), 43-50. <https://ijope.com/index.php/home/article/view/127>
- [201]. Chenchala, P. K., Choppadandi, A., Kaur, J., Nakra, V., & Pandian, P. K. G. (2020). Predictive Maintenance and Resource Optimization in Inventory Identification Tool Using ML. *International Journal of Open Publication and Exploration*, 8(2), 43-50. <https://ijope.com/index.php/home/article/view/127>
- [202]. 2019
- [203]. [ Jagbir. : "Kaur, J., Choppadandi, A., Chenchala, P. K., Nakra, V., & Pandian, P. K. G. (2019). AI Applications in Smart Cities( Jagbir 2019)" ]
- [204]. Kaur, J., Choppadandi, A., Chenchala, P. K., Nakra, V., & Pandian, P. K. G. (2019). Case Studies on Improving User Interaction and Satisfaction using AI-Enabled Chatbots for Customer Service. *International*

- Journal of Transcontinental Discoveries, 6(1), 29-34.  
<https://internationaljournals.org/index.php/ijtd/article/view/98>
- [205]. Choppadandi, A., Kaur, J., Chenchala, P. K., Kanungo, S., & Pandian, P. K. K. G. (2019). AI-Driven Customer Relationship Management in PK Salon Management System. *International Journal of Open Publication and Exploration*, 7(2), 28-35. <https://ijope.com/index.php/home/article/view/128>. ]
- [206]. Kaur, J., Choppadandi, A., Chenchala, P. K., Nakra, V., & Pandian, P. K. G. (2019). Case Studies on Improving User Interaction and Satisfaction using AI-Enabled Chatbots for Customer Service. *International Journal of Transcontinental Discoveries*, 6(1), 29-34.  
<https://internationaljournals.org/index.php/ijtd/article/view/98>