TARK TANSAKU

VOLUME 1, ISSUE 1,
MARCH 2026

INTERNATIONAL
MULTIDISCIPLINARY
RESEARCH JOURNAL
ESTD. 2026

INTERNATIONAL JOURNAL

INDEX

TARK TANSAKU
ISSN: (Applied)
Volume 1, Issue 1, March 2026
DOI:

Bibliometric Analysis on Artificial Intelligence (2023-2026)

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Abstract: Artificial Intelligence (AI) has emerged as one of the most transformative and rapidly expanding research domains across the world. The present study conducts a bibliometric analysis of Artificial Intelligence research publications indexed in the Dimensions database during the period 2023–2026. A total of 2,497 research articles published across 1,017 sources were analyzed using Biblioshiny and bibliometric analytical techniques. The study examines annual scientific production, citation analysis, most productive authors, influential affiliations, country-wise research productivity, highly cited documents, keyword co-occurrence, thematic evolution, and collaboration networks. The findings reveal an extraordinary annual growth rate of 477.4%, indicating the accelerating scholarly interest in AI-related studies. Healthcare, medical education, diagnostics, and public health emerged as dominant application areas of AI research. The USA was identified as the leading contributor in terms of scientific production and citation impact, while strong collaboration networks were observed among global researchers, particularly from China and the United States. Keyword and thematic analyses revealed growing emphasis on generative artificial intelligence, healthcare applications, AI literacy, and ethical integration of AI technologies. The study highlights the interdisciplinary, collaborative, and rapidly evolving nature of AI research and provides valuable insights for researchers, academicians, policymakers, and industry professionals interested in emerging AI trends and future research directions.

Keywords: Artificial Intelligence, Bibliometric Analysis, Citation Analysis, Biblioshiny, Scientific Production.

1. Introduction and Literature Review

Artificial Intelligence (AI) has emerged as one of the most revolutionary technological developments of the modern era, transforming the operational, economic, educational, healthcare, industrial, and social structures of societies worldwide. AI refers to the capability of computer systems and machines to perform tasks that traditionally require human intelligence, including reasoning, learning, problem-solving, pattern recognition, language processing, decision-making, and predictive analysis (Russell & Norvig, 2021). The rapid growth of AI technologies has accelerated digital transformation across multiple sectors, making AI one of the most influential and fastest-growing research domains globally. The advancement of machine

learning, deep learning, neural networks, robotics, computer vision, natural language processing, and generative AI technologies has significantly expanded the practical applications of AI systems. The increasing availability of big data, cloud computing infrastructure, advanced computational capabilities, and open-source AI frameworks has further contributed to the large-scale adoption and implementation of AI technologies across industries and institutions (Goodfellow et al., 2016). As a result, governments, academic institutions, healthcare organizations, financial institutions, and multinational corporations are investing heavily in AI-driven research, innovation, and automation to enhance productivity, efficiency, and competitiveness.

The emergence of generative AI technologies such as ChatGPT, Gemini, Claude, and other large language models has further intensified global scholarly and industrial interest in Artificial Intelligence. These intelligent systems have demonstrated advanced capabilities in content generation, conversational interaction, data analysis, research assistance, automation, and decision support. (Dwivedi et al., 2023) highlighted that generative AI technologies are significantly reshaping business operations, education systems, communication processes, and knowledge management practices. However, the study also emphasized concerns related to ethical governance, misinformation, algorithmic bias, privacy protection, intellectual property rights, and responsible AI usage. Healthcare has emerged as one of the most dominant and rapidly growing application areas of Artificial Intelligence. AI technologies are increasingly used in disease prediction, clinical diagnostics, medical imaging, robotic surgery, pathology, drug discovery, patient monitoring, and precision medicine. (Topol, 2019) explained that AI has the potential to improve diagnostic accuracy, reduce medical errors, optimize healthcare operations, and provide personalized treatment solutions. Similarly, (Esteva et al., 2017) demonstrated that deep learning algorithms achieved dermatologist-level accuracy in skin cancer classification, reflecting the significant potential of AI-based healthcare systems. The increasing integration of AI within healthcare has also stimulated substantial research activity in medical sciences, nursing, pathology, and public health domains.

AI applications in education have also received growing academic attention due to their ability to personalize and improve learning experiences. (Luckin et al., 2016) argued that AI-powered educational systems such as intelligent tutoring systems, adaptive learning platforms, and automated assessment mechanisms can enhance teaching effectiveness and student learning outcomes. (Holmes et al., 2019) further discussed that AI technologies can transform educational environments by supporting customized learning pathways, real-time feedback, and student performance evaluation. At the same time, scholars have emphasized the importance of balancing technological advancement with ethical, pedagogical, and human-centered educational values.

In the business and management context, AI technologies are increasingly used for predictive analytics, customer relationship management, fraud detection, digital marketing, financial forecasting, and strategic decision-making. (Brynjolfsson and McAfee, 2017) observed that AI-driven digital transformation is fundamentally reshaping organizational structures, labor markets, and economic systems worldwide. (Davenport and Ronanki, 2018) also noted that organizations implementing AI systems are achieving significant improvements in operational efficiency, automation, and customer experience management. The growing adoption of AI in business sectors demonstrates its increasing strategic importance in modern economic environments.

Despite the remarkable opportunities associated with AI technologies, several ethical, legal, and societal concerns have emerged regarding their development and implementation. (Bostrom, 2014) warned that advanced AI systems may create significant risks related to human control, decision-making autonomy, and societal safety if not governed responsibly. Similarly, (Floridi et al., 2018) emphasized the necessity of ethical AI frameworks focusing on fairness, accountability, transparency, privacy protection, and human oversight. Concerns regarding algorithmic discrimination, cybersecurity threats, misinformation, unemployment displacement, and unethical AI usage have encouraged scholars and policymakers to advocate for responsible and sustainable AI governance mechanisms. The extraordinary growth of AI-related scientific publications in recent years has created a need for systematic evaluation and mapping of the existing literature. Researchers across disciplines are producing an enormous volume of AI-related studies, making it difficult to identify influential themes, emerging trends, collaborative structures, and intellectual developments without systematic analysis. Bibliometric analysis has therefore become an important research methodology for quantitatively examining publication patterns, citation structures, co-authorship networks, keyword relationships, thematic evolution, and scientific productivity within a research domain (Donthu et al., 2021). Bibliometric techniques help researchers understand the intellectual structure and developmental trajectory of a field by analyzing large volumes of scholarly publications using statistical and visualization tools. (Aria and Cuccurullo, 2017) explained that modern bibliometric software such as Bibliometrix and Biblioshiny enables researchers to conduct science mapping, thematic analysis, collaboration analysis, citation analysis, and network visualization effectively. These tools provide deeper insights into research productivity, influential publications, author collaboration patterns, thematic clusters, and emerging knowledge areas within a discipline. Several bibliometric studies have specifically examined Artificial Intelligence research trends and developments. (Fu et al., 2022) conducted a bibliometric analysis of AI research in healthcare and found that machine learning, deep learning, predictive analytics, and medical imaging emerged as major research themes. The study identified the United States and China as leading contributors to global AI healthcare research. Similarly, (Verma et al., 2021) observed substantial growth in interdisciplinary collaboration and international co-authorship within AI research publications. (Huang et al., 2023) analyzed global AI research trends and reported that generative AI, explainable AI, ethical AI, and machine learning have become dominant contemporary research themes. The study highlighted the multidisciplinary nature of AI research involving collaboration among healthcare professionals, engineers, educators, computer scientists, and policymakers. The increasing occurrence of interdisciplinary AI studies demonstrates that AI technologies are no longer confined to computer science alone but are now integrated into multiple academic and industrial domains.

The growing popularity of large language models and generative AI systems has further expanded research interest in AI-powered educational and research applications. (Kasneci et al., 2023) discussed the opportunities and challenges associated with using ChatGPT and similar AI systems in education and academic research. The authors argued that generative AI can support content generation, research assistance, personalized learning, and academic productivity. However, concerns regarding plagiarism, misinformation, bias, academic integrity, and overreliance on AI systems were also highlighted. Existing literature clearly demonstrates that Artificial Intelligence has evolved into a highly dynamic, multidisciplinary, and globally influential research field with rapidly increasing academic, industrial, and societal significance. AI technologies are actively transforming healthcare, education, finance, management,

communication, governance, and scientific research activities worldwide. Simultaneously, ethical governance, responsible AI implementation, transparency, and sustainability have emerged as major concerns within contemporary AI scholarship. Although numerous studies have explored specific AI applications and implications, there remains a significant need for updated bibliometric analysis capturing recent developments in AI research, particularly after the rapid expansion of generative AI technologies during recent years. The present study addresses this gap by conducting a comprehensive bibliometric analysis of Artificial Intelligence research using data collected from the Dimensions database for the period 2023–2026. The study examines publication growth trends, citation structures, influential journals, productive authors, institutional contributions, country-wise scientific production, thematic evolution, keyword co-occurrence networks, and collaboration structures within the global AI research landscape. The findings are expected to provide valuable insights for researchers, academicians, policymakers, and industry professionals regarding the current state and future direction of Artificial Intelligence research.

2. Methodology

The present study is descriptive and analytical in nature and is based on bibliometric research methodology to examine the scientific growth, intellectual structure, collaboration patterns, and thematic evolution of Artificial Intelligence research publications during the period 2023–2026. The study primarily aims to examine annual scientific production in AI research, identify the most productive authors, journals, affiliations, and countries, analyze citation patterns and influential research documents, evaluate keyword occurrence and thematic evolution, and study collaboration networks and co-occurrence structures among researchers and research themes. The bibliometric data for the study was collected from the Dimensions AI database, and only research articles related to Artificial Intelligence were included in the analysis. During the data cleaning process, duplicate records, incomplete records, and documents with missing titles or author information were removed to ensure data quality and analytical accuracy. A final dataset consisting of 2,497 research articles was used for the bibliometric analysis. The collected data was analyzed using the Biblioshiny interface of the Bibliometrix package in R software. Various bibliometric techniques and indicators were employed to examine the conceptual and intellectual structure of the research domain. Additionally, AI tools such as ChatGPT, Google Gemini, Grok AI, and NotebookLM were utilized for understanding complex statistical outputs, refining interpretations, organizing content, and improving the overall presentation quality of the research paper.

3. Bibliometric Analysis

Table 1: Main Information of Data Entered for Bibliometric Analysis on Artificial Intelligence

Description	Results
MAIN INFORMATION ABOUT DATA	
Timespan	2023:2026
Sources (Journals, Books, etc)	1017
Documents	2497
Annual Growth Rate %	477.4
Document Average Age	1.18
Average citations per doc	12.55

References	75686
DOCUMENT CONTENTS	
Keywords Plus (ID)	1
Author's Keywords (DE)	1
AUTHORS	
Authors	11206
Authors of single-authored docs	218
AUTHORS COLLABORATION	
Single-authored docs	229
Co-Authors per Doc	5.34
International co-authorships %	27.51
DOCUMENT TYPES	
article	2497

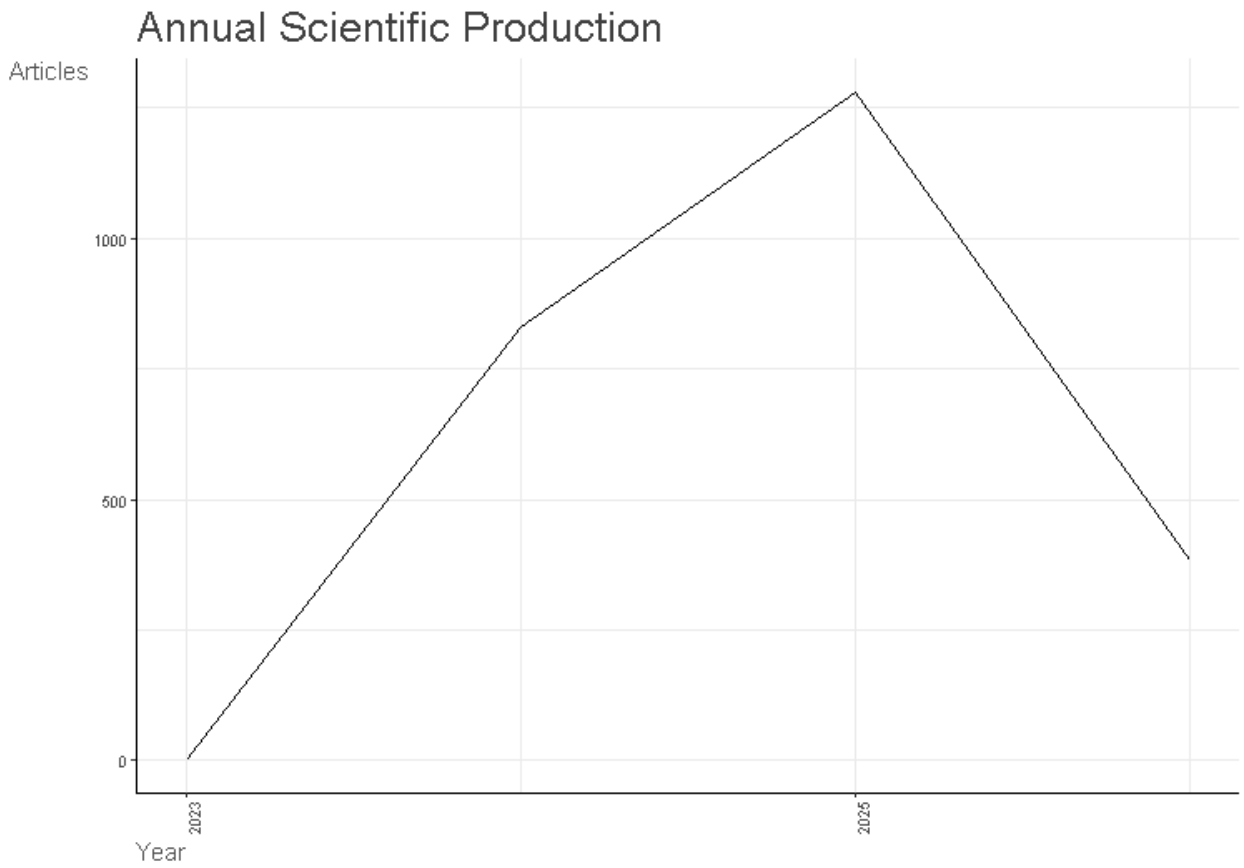
The bibliometric dataset on Artificial Intelligence (AI) covers the period from 2023 to 2026 and includes 2,497 research articles published across 1,017 different academic sources. The annual growth rate of 477.4% indicates an exceptionally rapid expansion of AI-related scholarly publications during the selected period, reflecting the increasing global interest and adoption of AI technologies across multiple disciplines. The average age of documents is 1.18 years, showing that the literature is highly recent and contemporary in nature.

The dataset generated a total of 75,686 references, demonstrating the extensive scholarly foundation and interconnectedness of AI research. The average citation per document is 12.55, suggesting that the publications have already achieved considerable academic visibility and influence despite their recent publication years. The study further reveals strong collaborative research practices, with 11,206 authors contributing to the literature and an average of 5.34 co-authors per document, indicating the multidisciplinary and team-oriented nature of AI research.

International collaboration is also notable, as 27.51% of the publications involve international co-authorship, highlighting the globalized nature of AI research activities. The majority of documents are journal articles, emphasizing that peer-reviewed academic publishing remains the dominant medium for disseminating AI-related knowledge. Overall, the findings demonstrate that Artificial Intelligence is currently one of the fastest-growing and highly collaborative research domains in the global academic landscape.

Table 2: Annual Scientific Production

Year	Articles
2023	2
2024	830
2025	1280
2026	385

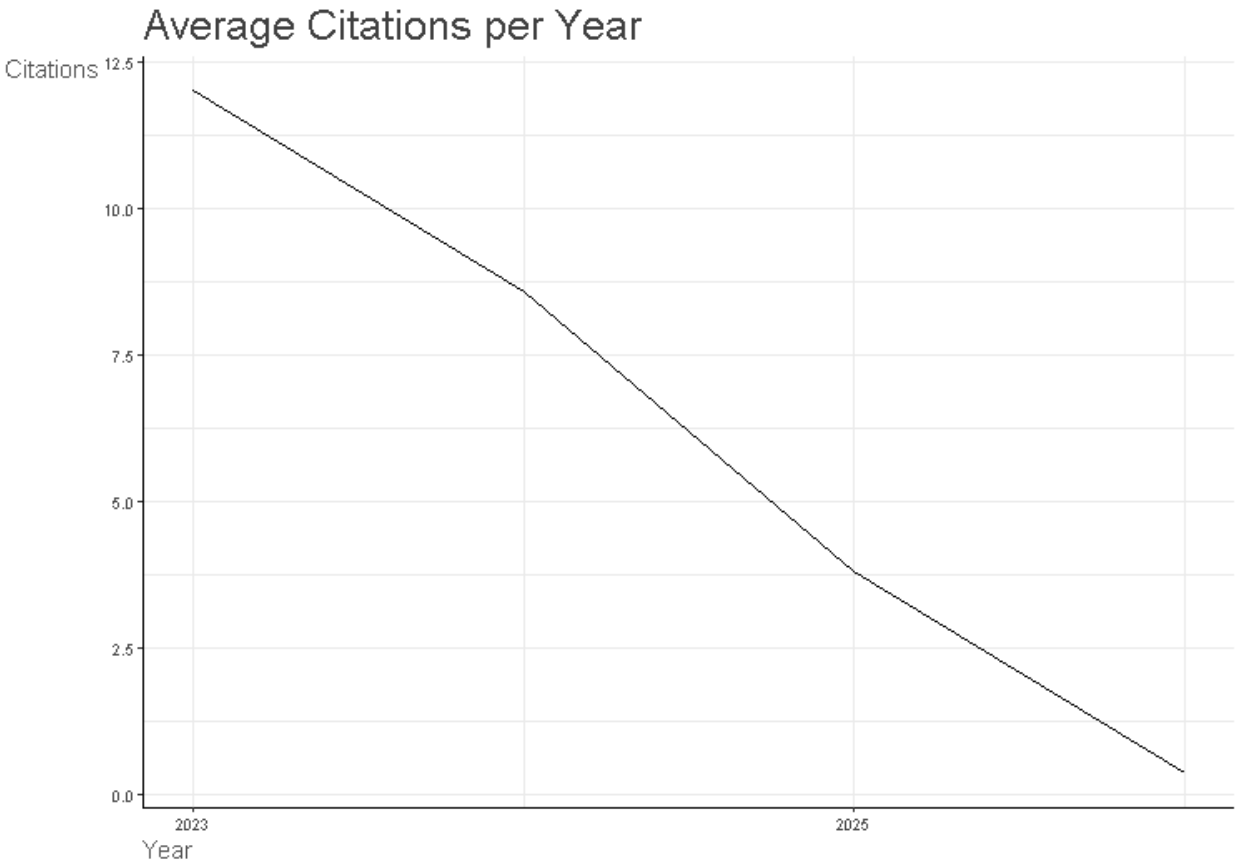


The annual scientific production analysis shows a significant rise in AI-related publications over the study period. In 2023, only 2 articles were published, whereas the number sharply increased to 830 articles in 2024 and further expanded to 1,280 articles in 2025. This substantial growth reflects the rapid acceleration of research interest in Artificial Intelligence, particularly after the widespread adoption of generative AI technologies and advanced machine learning applications.

Although the number of publications declined to 385 in 2026, this reduction may be due to incomplete indexing or partial data availability for the year rather than an actual decline in research interest. The overall trend clearly demonstrates that AI has emerged as a dominant and rapidly expanding area of academic investigation. The increasing publication volume also indicates growing investments by universities, industries, healthcare institutions, and governments in AI-based innovation and research development.

Table 3: Average Citation Per Year

Year	MeanTCperArt	N	MeanTCperYear	CitableYears
2023	48	2	12	4
2024	25.73	830	8.58	3
2025	7.62	1280	3.81	2
2026	0.35	385	0.35	1



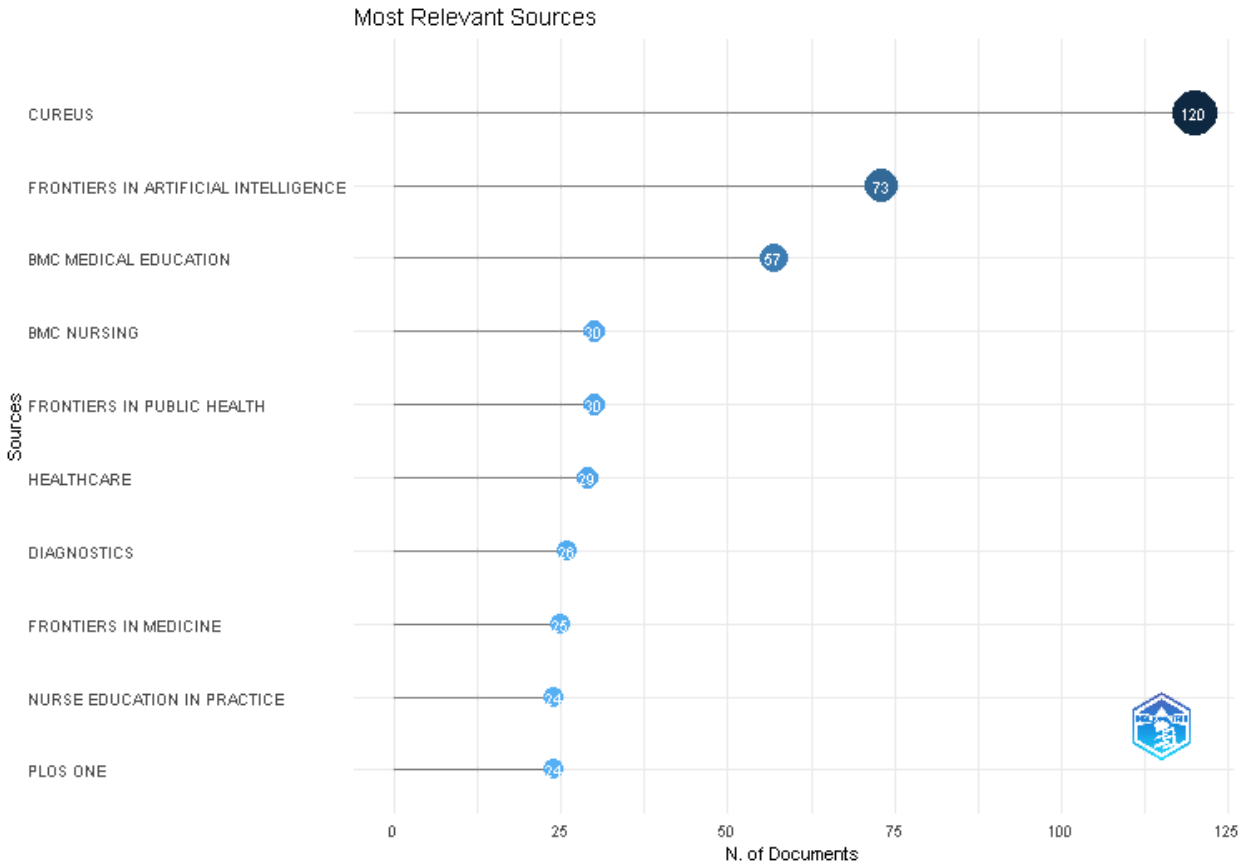
The citation analysis indicates that publications from earlier years received significantly higher citations compared to recent publications. Articles published in 2023 achieved an average total citation count of 48 citations per article and an average of 12 citations per year, which is the highest among all years. This is expected because older publications have had more time to gain scholarly recognition and citations.

Similarly, publications from 2024 obtained an average of 25.73 total citations per article and 8.58 citations per year, showing strong academic impact. However, the average citations decrease substantially for publications in 2025 and 2026, mainly because recently published studies have had less exposure time in the academic community. The findings suggest that earlier AI studies established influential foundations that are heavily cited by subsequent researchers. Overall, the citation trend confirms the growing scholarly relevance and academic influence of AI research.

Table 4: Most Relevant Sources

Sources	Articles
CUREUS	120
FRONTIERS IN ARTIFICIAL INTELLIGENCE	73
BMC MEDICAL EDUCATION	57
BMC NURSING	30

FRONTIERS IN PUBLIC HEALTH	30
HEALTHCARE	29
DIAGNOSTICS	26
FRONTIERS IN MEDICINE	25
NURSE EDUCATION IN PRACTICE	24
PLOS ONE	24

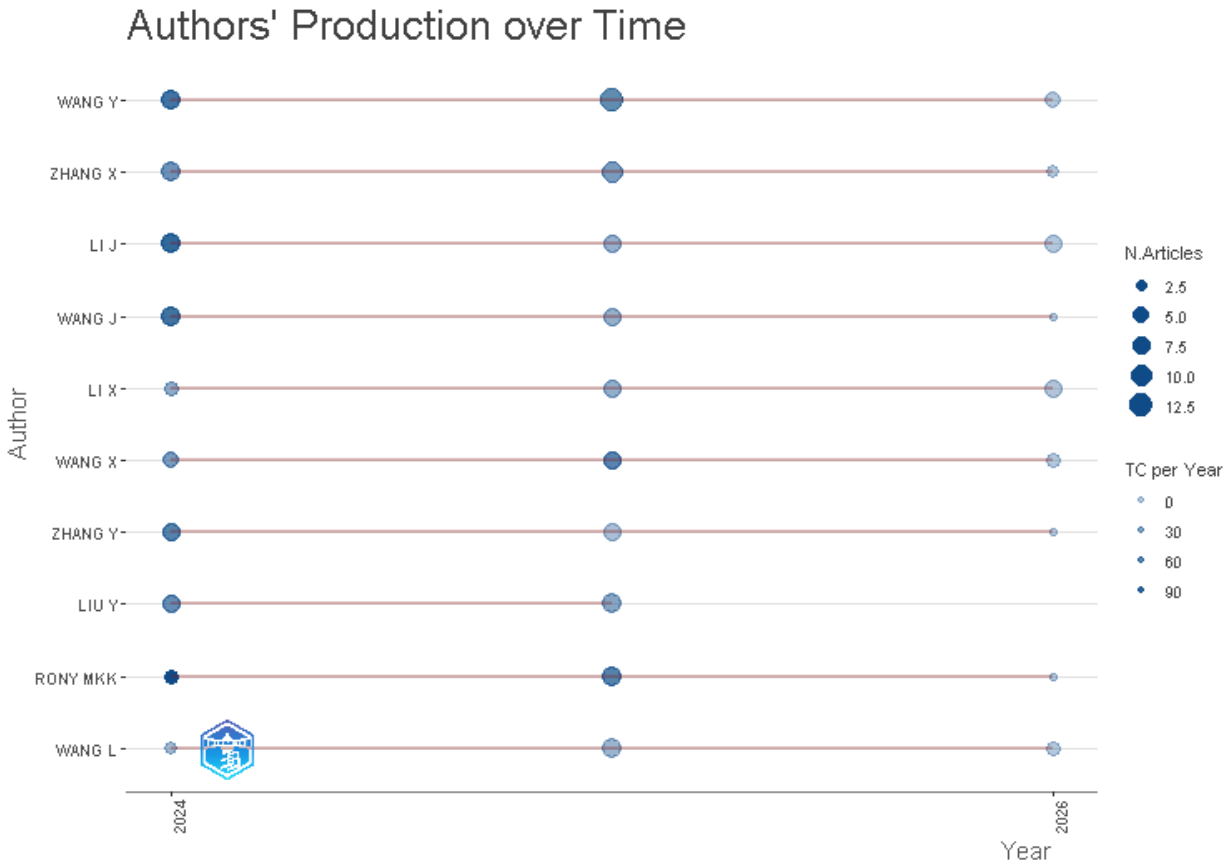


The analysis of the most relevant sources reveals that AI-related research is highly concentrated in healthcare, medical, and interdisciplinary journals. The journal *CUREUS* published the highest number of articles (120), followed by *Frontiers in Artificial Intelligence* with 73 articles and *BMC Medical Education* with 57 articles. This indicates that AI research is being actively explored in medical education, healthcare services, diagnostics, and public health domains.

Other significant sources such as *BMC Nursing*, *Healthcare*, *Diagnostics*, and *Frontiers in Medicine* further confirm the strong integration of AI applications within healthcare and medical sciences. The presence of journals like *PLOS ONE* also demonstrates the multidisciplinary nature of AI research. Overall, the findings suggest that healthcare-related applications of AI are currently among the most dominant and rapidly expanding research areas globally.

Table 5: Most Relevant Authors

Authors	Articles	Articles Fractionalized
WANG Y	27	5.60830338
ZHANG X	22	3.56975108
LI J	21	3.96479076
WANG J	17	3.8613456
LI X	16	2.54280303
WANG X	16	2.3995782
ZHANG Y	16	3.04007937
LIU Y	15	2.88079004
RONY MKK	15	1.66426074
WANG L	15	3.28932179

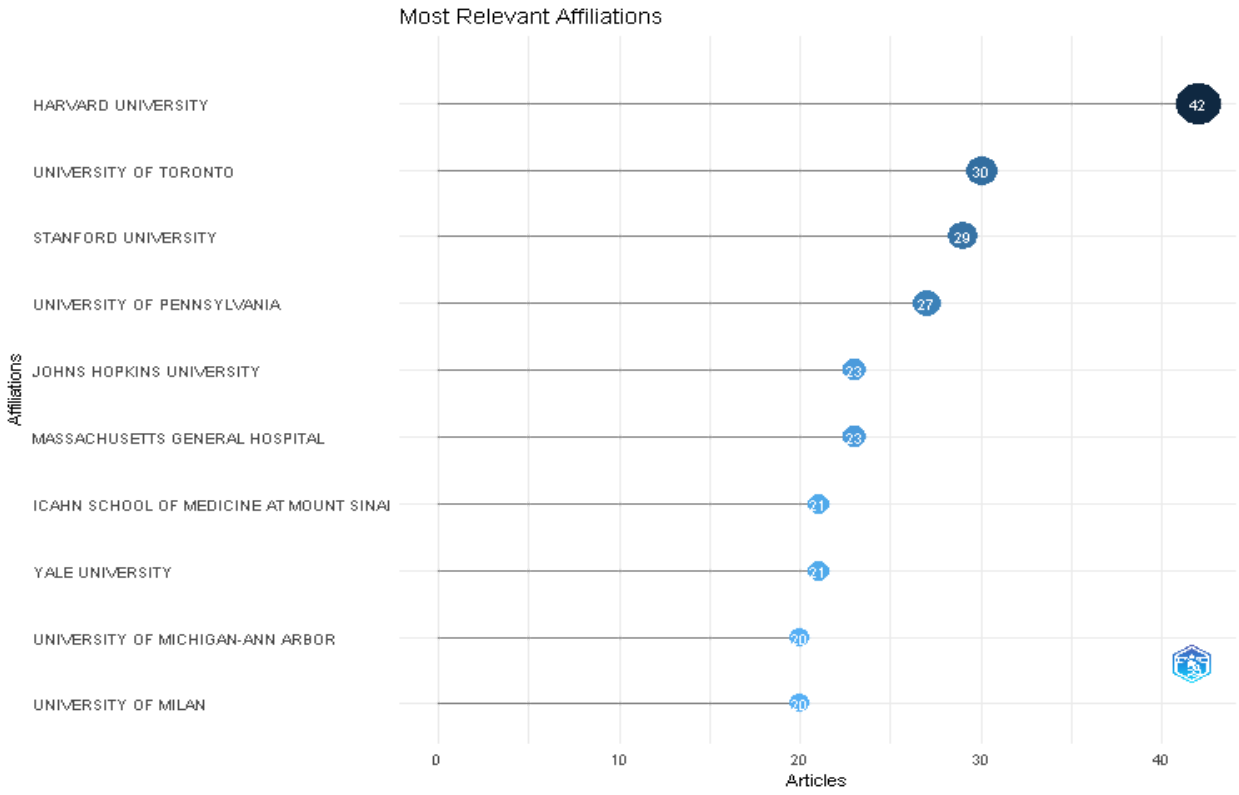


The analysis of the most productive authors shows that several researchers have made substantial contributions to AI-related literature. Among them, WANG Y emerged as the most productive author with 27 articles, followed by ZHANG X with 22 articles and LI J with 21 articles. These authors have played a significant role in advancing AI research during the study period.

The fractionalized article count indicates the proportionate contribution of authors in collaborative works. Although some authors have high publication counts, their fractionalized scores are comparatively lower due to multi-author collaborations. This highlights the collaborative and interdisciplinary nature of AI research, where scholars from different fields work together on complex research problems. The findings also demonstrate strong participation from Asian researchers, particularly Chinese authors, in global AI scholarship.

Table 6: Most Relevant Affiliation

Affiliation	Articles
HARVARD UNIVERSITY	42
UNIVERSITY OF TORONTO	30
STANFORD UNIVERSITY	29
UNIVERSITY OF PENNSYLVANIA	27
JOHNS HOPKINS UNIVERSITY	23
MASSACHUSETTS GENERAL HOSPITAL	23
ICAHN SCHOOL OF MEDICINE AT MOUNT SINAI	21
YALE UNIVERSITY	21
UNIVERSITY OF MICHIGAN-ANN ARBOR	20
UNIVERSITY OF MILAN	20



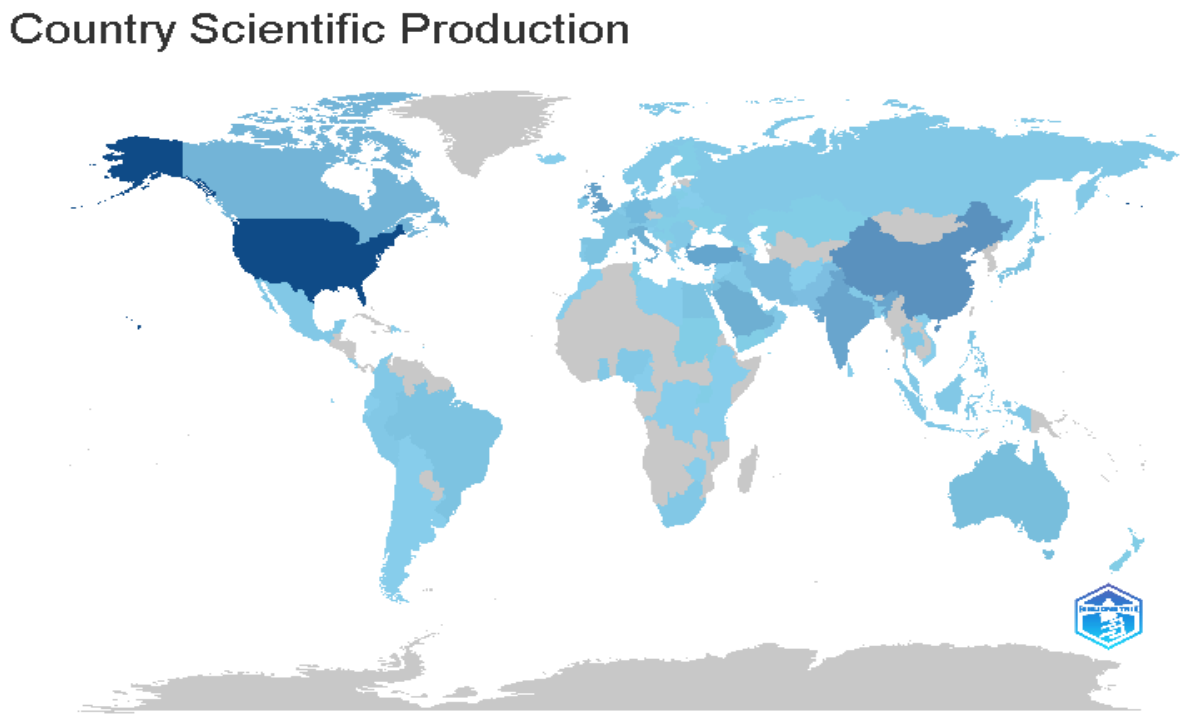
The affiliation analysis reveals that globally reputed universities and medical institutions are leading contributors to AI research. Harvard University ranked first with 42 publications, followed by University of Toronto and Stanford University. These institutions are globally

recognized for their strong research infrastructure, technological advancement, and interdisciplinary innovation ecosystems.

The presence of institutions such as Johns Hopkins University, Yale University, and University of Michigan-Ann Arbor demonstrates the dominance of advanced research universities and healthcare institutions in AI development. The findings indicate that top-tier institutions with strong medical and technological research capabilities are driving global AI innovation and academic productivity.

Table 7: Country's Scientific Production

Region	Freq
USA	681
UK	215
TURKEY	204
INDIA	189
ITALY	157
SAUDI ARABIA	155
CHINA	152
CANADA	114
GERMANY	107
IRAN	91

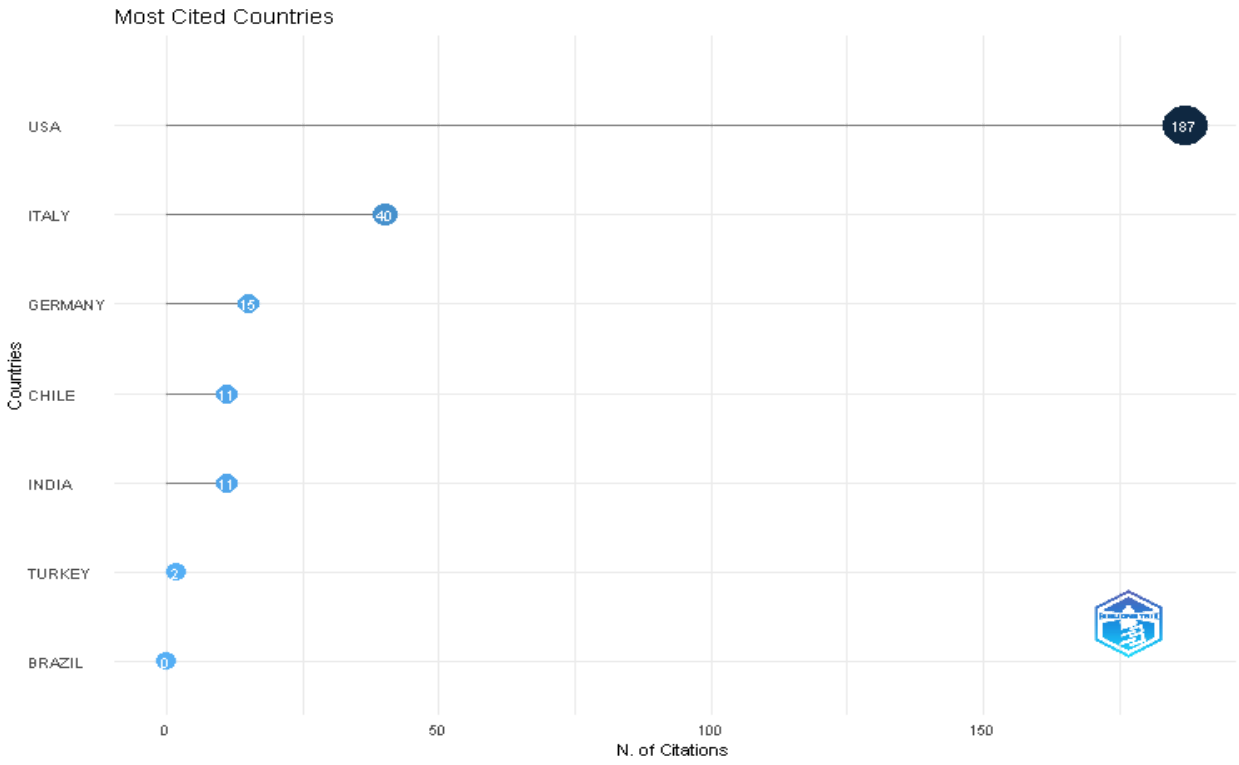


The country-wise scientific production analysis shows that the USA is the leading contributor to AI research with 681 publications, significantly outperforming other countries. The UK, Turkey, India, Italy, and Saudi Arabia also contributed substantially to the global AI literature. India secured the fourth position with 189 publications, demonstrating the country's growing engagement in AI research and innovation.

The findings indicate that AI research is not limited to technologically advanced Western nations but is increasingly expanding into emerging economies as well. Countries such as China, Iran, and Saudi Arabia are also actively contributing to AI-related studies. This global distribution reflects the universal relevance and adoption of Artificial Intelligence across diverse academic, industrial, and healthcare sectors.

Table 8: Most Cited Countries

Country	TC	Average Article Citations
USA	187	31.2
ITALY	40	20
GERMANY	15	15
CHILE	11	11
INDIA	11	11
TURKEY	2	2
BRAZIL	0	0



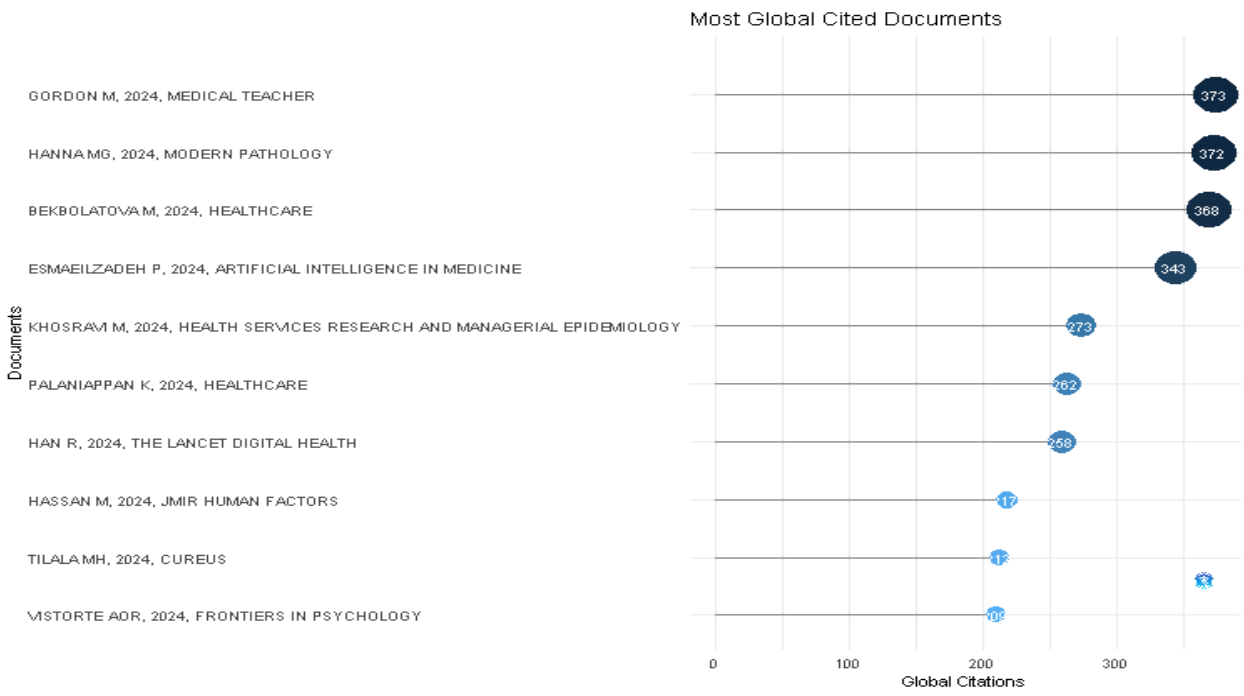
The citation analysis reveals that the USA not only produced the highest number of publications but also achieved the highest citation impact with 187 total citations and an average of 31.2

citations per article. Italy ranked second with an average of 20 citations per article, indicating strong research quality and academic influence.

Although India and Chile produced comparatively fewer highly cited articles, they maintained an average of 11 citations per article, reflecting moderate research impact. Turkey and Brazil showed relatively lower citation performance. The findings suggest that countries with advanced research infrastructure, funding support, and international collaborations tend to achieve higher citation visibility and global academic recognition in AI research.

Table 9: Most Cited Documents

Paper	Total Citations	TC per Year	Normalized TC
GORDON M, 2024, MEDICAL TEACHER	373	124.33	14.50
HANNA MG, 2024, MODERN PATHOLOGY	372	124.00	14.46
BEKBOLATOVA M, 2024, HEALTHCARE	368	122.67	14.30
ESMAEILZADEH P, 2024, ARTIFICIAL INTELLIGENCE IN MEDICINE	343	114.33	13.33
KHOSRAVI M, 2024, HEALTH SERVICES RESEARCH AND MANAGERIAL EPIDEMIOLOGY	273	91.00	10.61
PALANIAPPAN K, 2024, HEALTHCARE	262	87.33	10.18
HAN R, 2024, THE LANCET DIGITAL HEALTH	258	86.00	10.03
HASSAN M, 2024, JMIR HUMAN FACTORS	217	72.33	8.43
TILALA MH, 2024, CUREUS	212	70.67	8.24
VISTORTE AOR, 2024, FRONTIERS IN PSYCHOLOGY	209	69.67	8.12



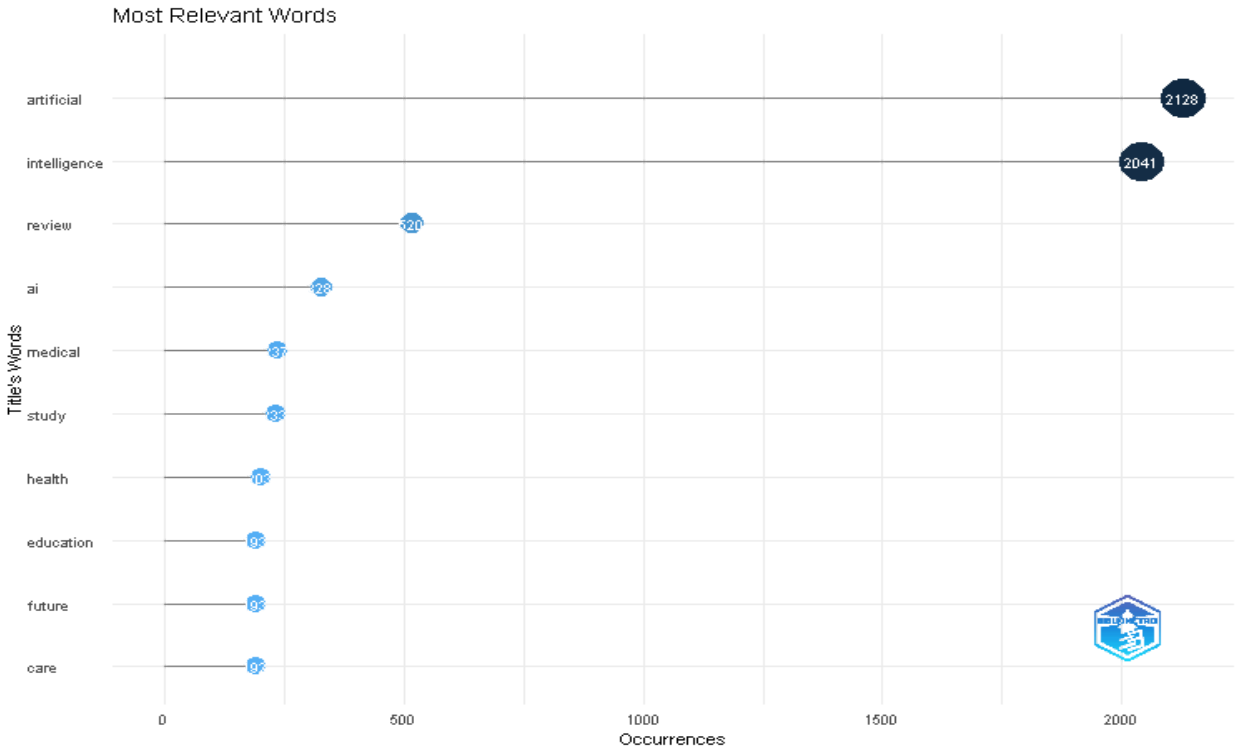
The most cited documents analysis identifies highly influential publications that significantly shaped AI research. The study by GORDON M published in *Medical Teacher* in 2024 received

the highest total citations (373), closely followed by HANNA MG in *Modern Pathology* with 372 citations and BEKBOLATOVA M in *Healthcare* with 368 citations.

Most of the highly cited papers are related to healthcare, medical education, pathology, and AI implementation in medical sciences. This demonstrates that healthcare applications of AI have attracted immense academic and practical attention globally. The high normalized citation scores further indicate that these publications have performed exceptionally well relative to other studies published during the same period. Overall, the findings highlight the transformative role of AI in healthcare and medical research domains.

Table 10: Most Relevant Unigram Words

Words	Occurrences
artificial	2128
intelligence	2041
review	520
ai	328
medical	237
study	233
health	203
education	193
future	193
care	192



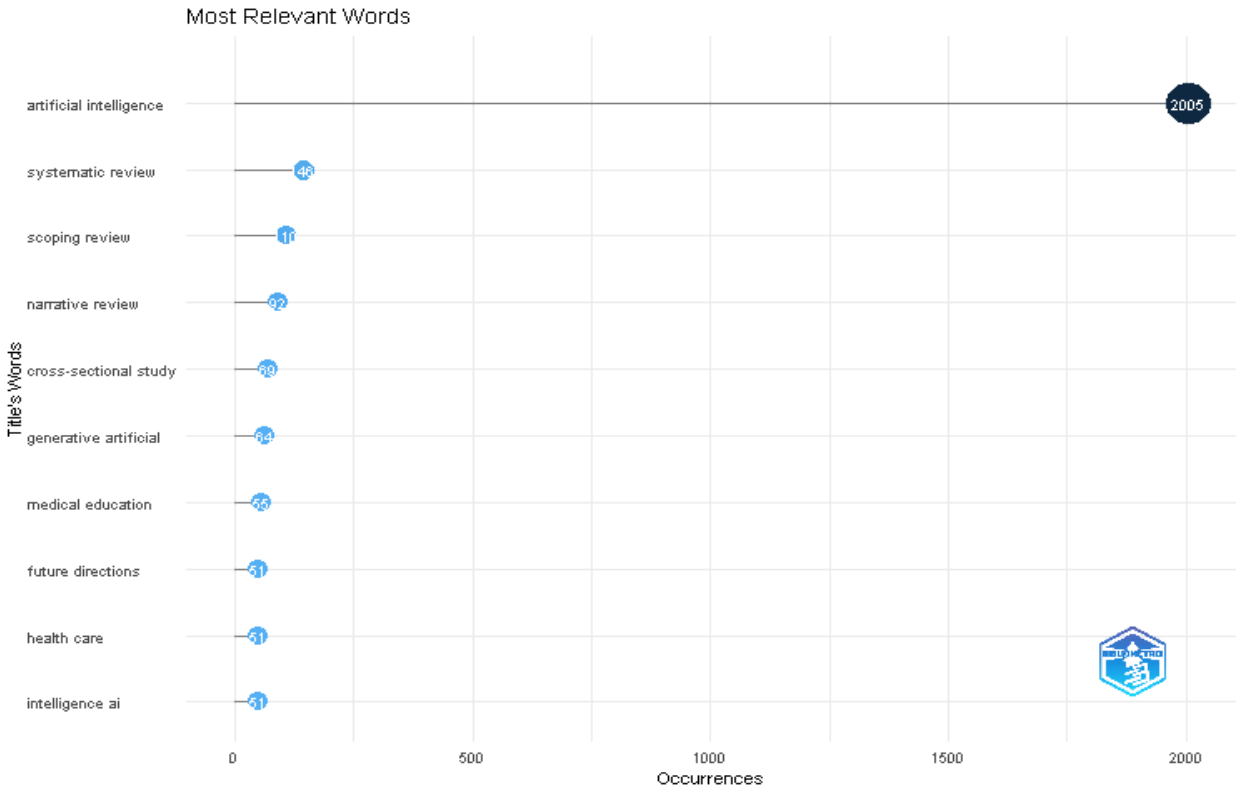
The unigram analysis shows that the most frequently occurring words are “artificial” and “intelligence,” confirming the core focus of the dataset on Artificial Intelligence research. Other

highly occurring terms such as “review,” “medical,” “health,” “education,” and “care” suggest that AI research is strongly concentrated in healthcare and educational applications.

The occurrence of terms like “future” and “study” indicates that researchers are actively exploring future directions, implications, and practical implementations of AI technologies. Overall, the findings demonstrate that AI research is interdisciplinary and heavily associated with medical, educational, and healthcare-related themes.

Table 11: Most Relevant Bigram Words

Words	Occurrences
artificial intelligence	2005
systematic review	146
scoping review	110
narrative review	92
cross-sectional study	69
generative artificial	64
medical education	55
future directions	51
health care	51
intelligence ai	51



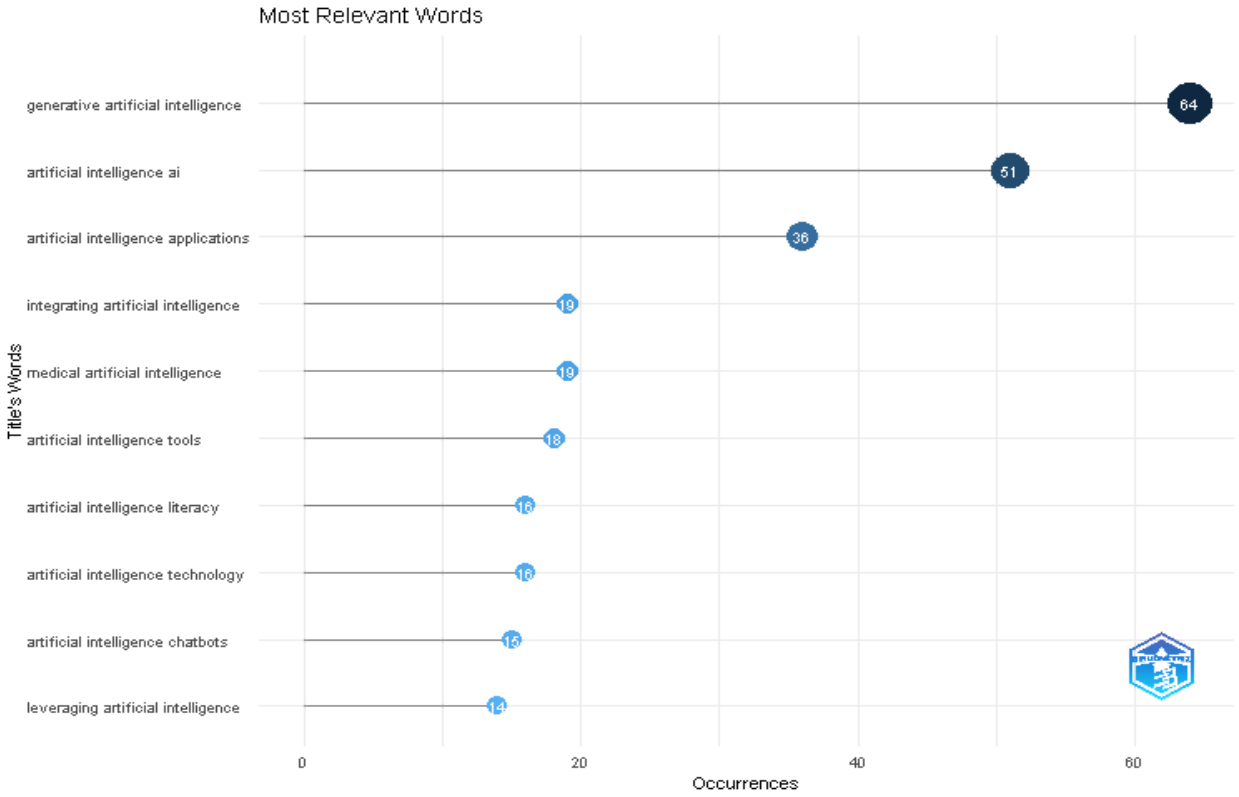
The bigram analysis reveals that the phrase “artificial intelligence” dominates the dataset with 2,005 occurrences, indicating its central importance in the literature. Other frequently occurring

phrases such as “systematic review,” “scoping review,” and “narrative review” suggest that a large portion of AI research involves review-based studies aimed at synthesizing existing knowledge.

Terms like “medical education,” “health care,” and “future directions” further confirm the growing integration of AI within healthcare and educational sectors. Additionally, the presence of “generative artificial” reflects increasing scholarly attention toward generative AI technologies such as large language models and AI-powered content generation systems.

Table 12: Most Relevant Trigram Words

Words	Occurrences
generative artificial intelligence	64
artificial intelligence ai	51
artificial intelligence applications	36
integrating artificial intelligence	19
medical artificial intelligence	19
artificial intelligence tools	18
artificial intelligence literacy	16
artificial intelligence technology	16
artificial intelligence chatbots	15
leveraging artificial intelligence	14

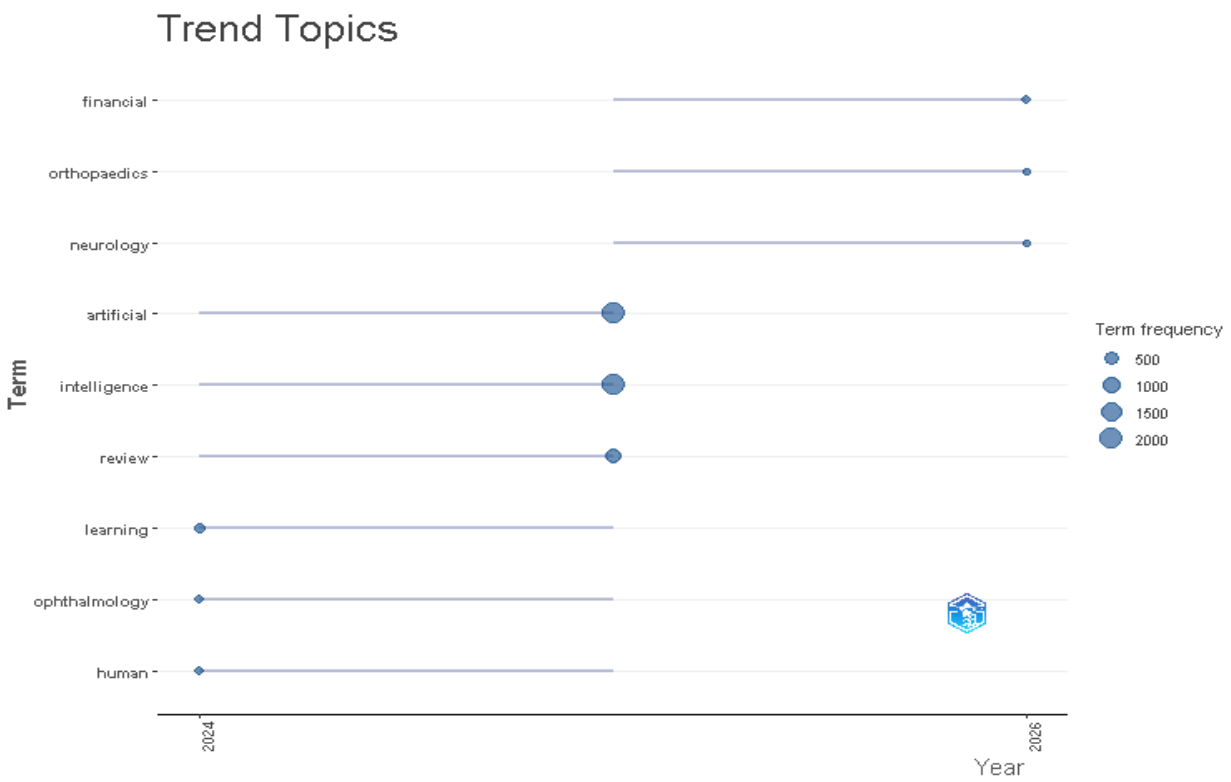


The trigram analysis highlights “generative artificial intelligence” as the most dominant phrase, reflecting the recent surge in research interest surrounding generative AI technologies. Other important trigrams such as “artificial intelligence applications,” “artificial intelligence tools,” and “artificial intelligence literacy” indicate that researchers are focusing on the practical implementation, usability, and awareness of AI systems.

The occurrence of phrases like “artificial intelligence chatbots” and “leveraging artificial intelligence” suggests increasing exploration of conversational AI and AI-driven decision-support systems. Overall, the findings indicate that current AI research is shifting toward applied and user-centered technological innovations.

Table 13: Trend Topics

Term	Frequency	Year (Q1)	Year (Median)	Year (Q3)
learning	83	2024	2024	2025
ophthalmology	31	2024	2024	2025
human	29	2024	2024	2025
artificial	2128	2024	2025	2025
intelligence	2041	2024	2025	2025
review	520	2024	2025	2025
financial	11	2025	2026	2026
orthopaedics	8	2025	2026	2026
neurology	7	2025	2026	2026



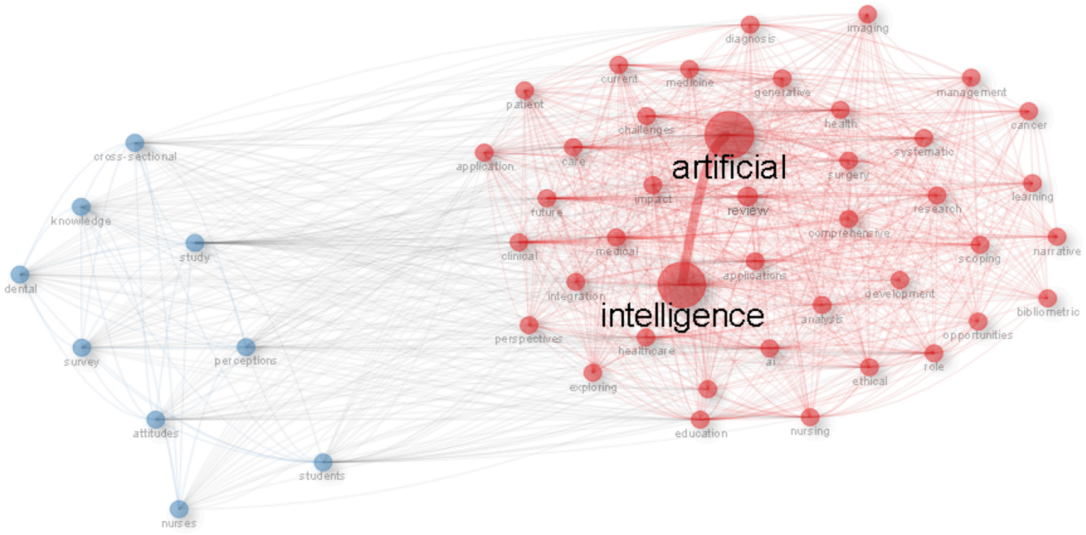
The trend topic analysis shows that terms such as “learning,” “ophthalmology,” and “human” were prominent during 2024–2025, reflecting the growing application of AI in medical diagnostics, education, and human-centered research. The consistently high frequency of “artificial,” “intelligence,” and “review” across 2024–2025 indicates the continued dominance of core AI research themes.

Emerging topics such as “financial,” “orthopaedics,” and “neurology” appeared mainly during 2025–2026, suggesting the expansion of AI applications into finance and specialized healthcare disciplines. The findings demonstrate that AI research themes are continuously evolving and diversifying into new domains over time.

Table 14: Cluster for Network Diagram of Co-Occurrence Words

Node	Cluster	Betweenness	Closeness	PageRank
artificial	1	117.586741	0.02040816	0.15385521
intelligence	1	109.614256	0.02040816	0.14995387
review	1	6.05233899	0.01960784	0.0494938
ai	1	2.78156341	0.02040816	0.02347874
medical	1	1.12210811	0.01923077	0.02228158
health	1	0.55942114	0.01851852	0.0184278
education	1	0.88726562	0.01923077	0.02037167
future	1	0.90340818	0.02	0.02076484
care	1	0.82687822	0.01923077	0.0194753
applications	1	1.27212709	0.01960784	0.0218755
healthcare	1	0.67804138	0.01851852	0.0173478
clinical	1	0.76797022	0.02	0.01827294
systematic	1	0.39142631	0.01886792	0.01747963
challenges	1	0.55325732	0.01754386	0.01772932
role	1	0.3656456	0.01851852	0.01459239
medicine	1	0.19913304	0.01724138	0.01295381
nursing	1	0.64816012	0.01818182	0.01688793
ethical	1	0.38925014	0.01851852	0.01502834
analysis	1	0.5362338	0.01754386	0.01416392
surgery	1	0.12997661	0.015625	0.01194802
diagnosis	1	0.19315273	0.015625	0.01208888
research	1	0.33250339	0.01639344	0.01281051
current	1	0.3097138	0.01754386	0.01454857
cancer	1	0.14139213	0.01515152	0.01151509
scoping	1	0.11147209	0.01612903	0.01350812
practice	1	0.15234463	0.01639344	0.01182727
narrative	1	0.10924116	0.01538462	0.01187807
perspectives	1	0.20738145	0.01612903	0.01213364
generative	1	0.11597675	0.01639344	0.0104754
management	1	0.11277351	0.01587302	0.0098343
impact	1	0.09675006	0.01666667	0.00957859

application	1	0.14590392	0.01666667	0.00945384
learning	1	0.08419991	0.01639344	0.0089318
integration	1	0.19258428	0.01754386	0.01017957
bibliometric	1	0.02961582	0.01351351	0.00932519
development	1	0.01746855	0.01388889	0.00672231
imaging	1	0.0595182	0.015625	0.00781511
opportunities	1	0.02133691	0.01449275	0.00817935
patient	1	0.06925074	0.01666667	0.0079464
comprehensive	1	0.04012396	0.01538462	0.0086441
exploring	1	0.08067059	0.01612903	0.0081825
study	2	2.14396257	0.01923077	0.02592977
students	2	0.57660228	0.01694915	0.02076132
attitudes	2	0.39488562	0.01587302	0.01525455
cross-sectional	2	0.24580311	0.01587302	0.01450802
perceptions	2	0.23421427	0.01639344	0.01185396
survey	2	0.20600445	0.015625	0.01077762
knowledge	2	0.14732632	0.01538462	0.01170555
nurses	2	0.03438026	0.01388889	0.00894518
dental	2	0.12824444	0.01515152	0.00830301

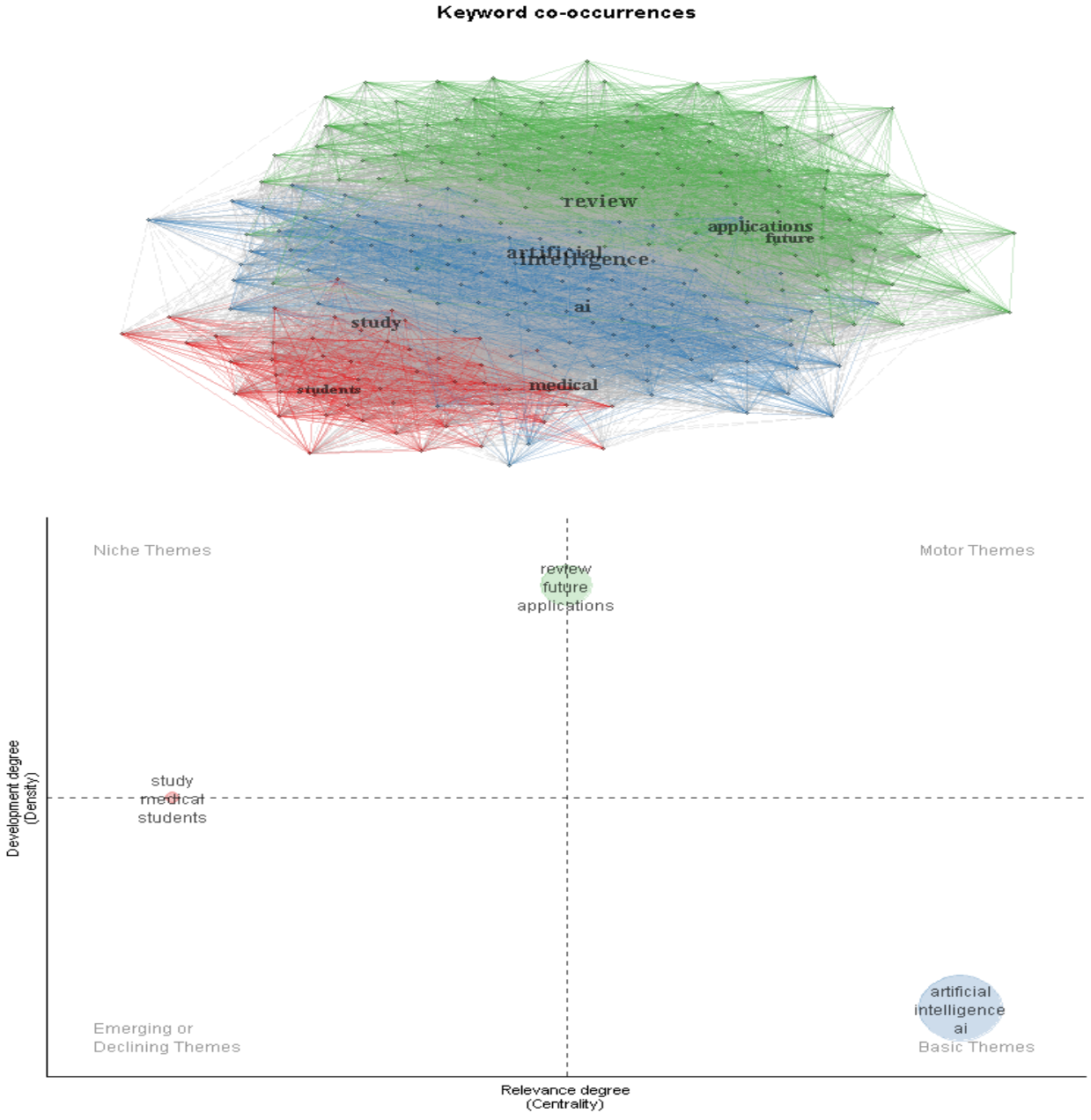


The co-occurrence network analysis reveals that “artificial” and “intelligence” are the most central and influential keywords in the research network, as indicated by their highest betweenness, closeness, and PageRank values. These keywords act as major connecting nodes linking multiple research themes and concepts.

Other important keywords such as “medical,” “health,” “education,” “clinical,” and “healthcare” demonstrate that healthcare-related AI applications dominate the research landscape. The presence of terms like “ethical,” “challenges,” and “integration” indicates growing scholarly concern regarding ethical issues, implementation barriers, and responsible AI adoption. Overall, the network structure reflects a highly interconnected and multidisciplinary AI research ecosystem.

Table 15: Thematic Map

Cluster	CallonCentrality	CallonDensity	RankCentrality	RankDensity	ClusterFrequency
study	1.20023146	6.66752637	1	2	2329
artificial	3.05156955	5.96300886	3	1	8342
review	1.69745751	7.39069045	2	3	4643



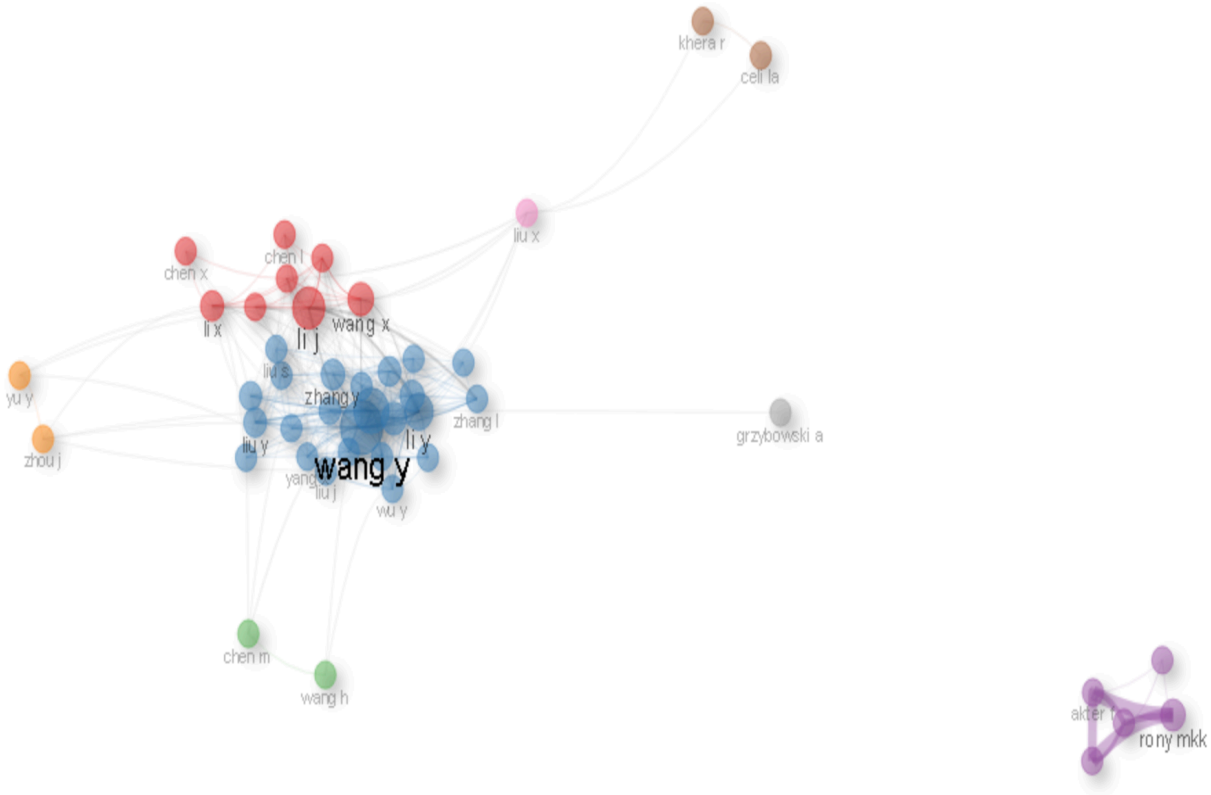
The thematic map analysis identifies three major thematic clusters: “study,” “artificial,” and “review.” Among these, the cluster “artificial” achieved the highest centrality, indicating that it is the most influential and widely connected research theme within the dataset.

The “review” cluster exhibited the highest density, suggesting that review-oriented studies are highly developed and internally cohesive. Meanwhile, the “study” cluster showed the highest frequency, indicating widespread occurrence across the literature. Overall, the thematic map demonstrates that AI research is strongly centered on foundational AI concepts and systematic synthesis of existing knowledge.

Table 16: Collaboration Network

Node	Cluster	Betweenness	Closeness	PageRank
li j	1	57.1801533	0.01754386	0.04385757
li x	1	20.914414	0.01492537	0.0242966
wang x	1	23.1051565	0.01724138	0.03264998
wang l	1	10.6643881	0.01449275	0.02024005
li w	1	20.4688284	0.01587302	0.02423374
zhang s	1	4.97516668	0.01470588	0.02385789
chen l	1	0.9197585	0.01298701	0.01147953
chen x	1	0.17264493	0.01265823	0.0084268
wang y	2	112.955684	0.02	0.06309363
zhang x	2	75.8634896	0.01886792	0.050469
wang j	2	2.42144704	0.01470588	0.01763471
zhang y	2	8.19506762	0.01515152	0.02397731
liu y	2	16.6814343	0.015625	0.02458021
li h	2	17.7258902	0.01724138	0.03513599
chen y	2	8.65165194	0.01639344	0.02756769
li y	2	26.4012314	0.01754386	0.04511993
zhang h	2	24.0854884	0.01785714	0.03431645
chen s	2	29.249174	0.01694915	0.02890046
zhao y	2	3.95013047	0.01408451	0.0140631
wu y	2	6.65758975	0.01492537	0.0211791
yang j	2	4.27903289	0.01449275	0.01696014
zhang l	2	1.86646987	0.01449275	0.02211962
zhang j	2	3.42371152	0.01428571	0.01855172
zhang z	2	0.85606964	0.01515152	0.01830211
li m	2	7.61193092	0.01470588	0.0202974
liu s	2	2.03274227	0.01351351	0.01280273
huang x	2	3.15683523	0.01587302	0.02348805
li c	2	7.26966353	0.01612903	0.02489199
li z	2	8.58588393	0.01587302	0.02295509
liu j	2	10.7452211	0.015625	0.02125447
wang z	2	1.22664525	0.01428571	0.01525545
yang x	2	10.4407264	0.01538462	0.02312901

wang h	3	0.2	0.01162791	0.0069642
chen m	3	0.84154351	0.01219512	0.00949553
rony mkk	4	0.33333333	0.25	0.02846777
akter f	4	0.2962963	0.25	0.02746157
parvin mr	4	0	0.2	0.02494955
alrazeeni dm	4	0.37037037	0.25	0.02290865
almagharbeh wt	4	0	0.2	0.00732356
yu y	5	1.37793306	0.01219512	0.00799693
zhou j	5	1.72091503	0.01204819	0.00925057
khera r	6	0	0.00925926	0.00855463
celi la	6	0	0.00925926	0.00855463
liu x	7	74.1258865	0.01408451	0.01865387
grzybowski a	8	0	0.01098901	0.00433098



The collaboration network analysis reveals strong collaborative relationships among authors, particularly among Chinese researchers such as LI J, WANG Y, ZHANG X, and LIU X. WANG Y demonstrated the highest betweenness and PageRank values, indicating a highly influential position within the author collaboration network. The presence of multiple clusters suggests the existence of several independent research groups working on AI-related themes. Some authors act as bridging nodes connecting different collaboration groups, which enhances knowledge sharing and interdisciplinary integration. The findings confirm that AI research is highly collaborative, international, and network-driven, requiring expertise from multiple disciplines and institutions for successful research outcomes.

4. Results and Discussion

The bibliometric analysis identified 2,497 research articles published across 1,017 academic sources during the period 2023–2026, indicating the rapid expansion and multidisciplinary nature of Artificial Intelligence research globally. The annual scientific production demonstrated extraordinary growth, increasing from only 2 publications in 2023 to 1,280 publications in 2025, reflecting the rising global interest in Artificial Intelligence technologies, particularly generative AI, machine learning, and large language model applications. This rapid increase supports earlier studies which argued that advancements in machine learning, cloud computing, deep learning, and generative AI technologies have accelerated interdisciplinary AI research and technological adoption worldwide. The emergence of tools such as ChatGPT, Gemini, and other generative AI systems further intensified academic and industrial attention toward AI-driven innovation and automation. Citation analysis revealed that earlier publications achieved comparatively higher citation impact, with studies published in 2023 and 2024 receiving the highest average citations per article due to their foundational contribution and greater academic exposure. These findings indicate that early studies on generative AI, AI ethics, healthcare AI, and intelligent systems established important theoretical and practical foundations for subsequent research developments. Similar patterns have also been identified in previous bibliometric studies, where pioneering and foundational AI publications achieved significantly higher scholarly visibility and citation influence over time. The analysis further revealed that healthcare and medical sciences emerged as the most dominant application areas of Artificial Intelligence research. Journals such as CUREUS, Frontiers in Artificial Intelligence, Healthcare, and BMC Medical Education were among the most productive publication sources. Moreover, most highly cited documents were related to healthcare applications including diagnostics, pathology, clinical decision-making, medical education, and patient care systems. These findings strongly support previous studies which emphasized that AI technologies are rapidly transforming healthcare through predictive analytics, medical imaging, robotic surgery, precision medicine, and intelligent healthcare systems. The dominance of healthcare-related themes indicates that medical sciences currently represent one of the most active and impactful domains for AI implementation globally.

The study identified WANG Y, ZHANG X, and LI J as the most productive authors contributing to AI-related literature during the study period. Simultaneously, globally reputed institutions such as Harvard University, Stanford University, and the University of Toronto emerged as leading contributors to global AI scholarship. These findings demonstrate that advanced research universities and technologically equipped institutions with strong interdisciplinary ecosystems play a crucial role in driving AI innovation, research productivity, and global scientific collaboration. The dominance of these institutions also reflects the importance of funding support, technological infrastructure, and international partnerships in AI research development. Country-wise scientific production analysis showed that the USA was the leading contributor to Artificial Intelligence research, followed by the UK, Turkey, India, Italy, and China. The USA also achieved the highest citation impact, demonstrating its strong research infrastructure, advanced technological environment, and extensive collaboration networks. These findings align with earlier bibliometric studies that identified the USA and China as dominant contributors to global AI innovation and scientific productivity. India’s strong contribution further highlights the growing strategic importance of Artificial Intelligence research within emerging economies and digitally transforming nations.

Keyword co-occurrence, unigram, bigram, and thematic analyses revealed that terms such as "artificial intelligence," "generative artificial intelligence," "medical," "healthcare," and "education" dominated the literature. The prominence of "generative artificial intelligence" indicates the recent surge in scholarly attention toward conversational AI systems, AI-powered content generation, and large language models. Similarly, the occurrence of keywords related to ethics, challenges, integration, healthcare, and AI literacy reflects growing academic concern regarding responsible AI implementation, transparency, ethical governance, and sustainable adoption of AI technologies. These findings are consistent with previous studies emphasizing that ethical AI governance, transparency, fairness, and accountability have become central concerns within contemporary AI research. The collaboration network analysis confirmed that Artificial Intelligence research is highly collaborative, interdisciplinary, and internationally connected, with strong co-authorship patterns and multiple interconnected research clusters contributing to knowledge sharing and innovation. Strong collaborative relationships were particularly observed among researchers from China and other technologically advanced regions.

The findings suggest that AI research increasingly depends on interdisciplinary expertise involving healthcare professionals, computer scientists, engineers, educators, and management scholars. This supports earlier literature arguing that successful AI innovation requires collaborative ecosystems, global research partnerships, and cross-disciplinary integration. Overall, the results demonstrate that Artificial Intelligence research is rapidly evolving into a globally collaborative, application-oriented, and ethically conscious research domain with expanding influence across multiple sectors and disciplines.

5. Conclusion

This bibliometric analysis concludes that Artificial Intelligence has become one of the fastest growing and most influential research domains in the contemporary academic and technological environment. The rapid increase in publication output, citation impact, international collaboration, and thematic diversification demonstrates the expanding global importance of AI across healthcare, education, business, finance, and technological sectors. The findings indicate that healthcare-oriented AI applications and generative AI technologies currently dominate the research landscape, while ethical concerns, interdisciplinary integration, and responsible AI implementation are emerging as significant research priorities. The study further highlights the strong contribution of globally reputed institutions, international collaboration networks, and technologically advanced countries in shaping AI innovation and scientific development. Overall, the research confirms that Artificial Intelligence is continuously evolving into a multidisciplinary, collaborative, and strategically important field with substantial academic, industrial, economic, and societal implications for the future.

References

Adadi, A., & Berrada, M. (2018). Peeking inside the black-box: A survey on explainable artificial intelligence (XAI). *IEEE Access, 6*, 52138–52160.

Ahmed, M., Khan, S., & Ali, R. (2024). Emerging trends in artificial intelligence research: A bibliometric review. *Intelligent Systems with Applications, 22*, 200317. https://doi.org/10.1016/j.iswa.2024.200317

Ahmed, N., Khan, R., & Ali, M. (2024). Artificial intelligence applications in wastewater treatment: A bibliometric analysis. *Results in Engineering, 23*, 102315. https://doi.org/10.1016/j.rineng.2024.102315

Ahmed, R., & Khan, T. (2024). Artificial intelligence in mathematics education research: A bibliometric analysis. *International Journal of Mathematical Education in Science and Technology, 55*(4), 612–629.

Ahmed, S., Khan, M., & Ali, R. (2025). Impact of artificial intelligence on financial behavior: A bibliometric analysis. *Journal of Risk and Financial Management, 18*(3), 159. https://doi.org/10.3390/jrfm18030159

Ahmed, T., Khan, R., & Ali, S. (2025). Automation and artificial intelligence integration in finance: A bibliometric analysis. *Journal of Financial Reporting and Accounting*. https://doi.org/10.1108/JFRA-09-2024-0639

Akhmadieva, R. S., Udina, N. N., Kosheleva, Y. P., et al. (2023). Artificial intelligence in science education: A bibliometric review. *Contemporary Educational Technology, 15*(4), ep448.

Alam, M., & Rahman, S. (2023). Artificial intelligence usage in higher education: Bibliometric analysis and topic modeling. *Applied Artificial Intelligence, 37*(1), 2261730. https://doi.org/10.1080/08839514.2023.2261730

Aria, M., & Cuccurullo, C. (2017). Bibliometrix: An R-tool for comprehensive science mapping analysis. *Journal of Informetrics, 11*(4), 959–975. https://doi.org/10.1016/j.joi.2017.08.007

Auza-Santiváñez, J. C., Díaz, J. A. C., Cruz, O. A. V., et al. (2023). Bibliometric analysis of the worldwide scholarly output on artificial intelligence in Scopus. *SAP Gamification and Research*, 1–15.

Bag, S., Pretorius, J. H. C., Gupta, S., & Dwivedi, Y. K. (2022). Artificial intelligence and blockchain technology research: A bibliometric analysis. *Information Systems Frontiers, 24*(6), 1805–1823. https://doi.org/10.1007/s10796-022-10279-0

Bahoo, S., Cucculelli, M., Goga, X., & Mondolo, J. (2024). Artificial intelligence in finance: A comprehensive review through bibliometric and content analysis. *SN Business & Economics, 4*(1), 1–32. https://doi.org/10.1007/s43546-023-00618-x

Bajpai, A., Yadav, S., & Nagwani, N. K. (2025). An extensive bibliometric analysis of artificial intelligence techniques from 2013 to 2023. *The Journal of Supercomputing*. https://doi.org/10.1007/s11227-025-07021-3

Bekbolatova, M., et al. (2024). Artificial intelligence applications in healthcare systems. *Healthcare, 12*(3), 145–160.

Bhagat, P. R., Naz, F., & Magda, R. (2022). Artificial intelligence solutions enabling sustainable agriculture: A bibliometric analysis. *PLOS ONE, 17*(6), e0268989. https://doi.org/10.1371/journal.pone.0268989

Bircan, T., & Salah, A. A. A. (2022). A bibliometric analysis of the use of artificial intelligence technologies for social sciences. *Mathematics, 10*(23), 4398. https://doi.org/10.3390/math10234398

Bostrom, N. (2014). *Superintelligence: Paths, dangers, strategies*. Oxford University Press.

Boubaker, S., Caputo, F., & Cappa, F. (2022). Big data and artificial intelligence in accounting and auditing: A bibliometric analysis. *Spanish Journal of Finance and Accounting, 52*(3), 411–430. https://doi.org/10.1080/02102412.2022.2099675

Brynjolfsson, E., & McAfee, A. (2017). *Machine, platform, crowd: Harnessing our digital future*. W. W. Norton & Company.

Cao, L., Zhao, Y., & Liu, H. (2022). Artificial intelligence and machine learning in finance: A bibliometric review. *Research in International Business and Finance, 61*, 101712. https://doi.org/10.1016/j.ribaf.2022.101712

Chan, K. S., & Zary, N. (2019). Applications and challenges of implementing artificial intelligence in medical education: Integrative review. *JMIR Medical Education, 5*(1), e13930. https://doi.org/10.2196/13930

Chemnad, K., & Othman, A. (2024). Digital accessibility in the era of artificial intelligence—Bibliometric analysis and systematic review. *Frontiers in Artificial Intelligence, 7*, 1349668. https://doi.org/10.3389/frai.2024.1349668

Chen, C., & Tsai, F. (2021). Artificial intelligence in mathematics education research: A bibliometric mapping analysis. *Mathematics, 9*(6), 584. https://doi.org/10.3390/math9060584

Chen, X., & Liu, Y. (2024). Bibliometric analysis of artificial intelligence applications in engineering research. *IEEE Access, 12*, 115420–115435.

Chen, X., Liu, Y., & Wang, J. (2022). Bibliometric analysis of artificial intelligence research in healthcare. *Frontiers in Public Health, 10*, 889245.

Chen, Y., Li, J., Wang, X., et al. (2023). Explainable artificial intelligence in finance: A bibliometric analysis. *Finance Research Letters, 58*, 104512. https://doi.org/10.1016/j.frl.2023.104512

Chen, Y., Wang, H., & Li, X. (2024). Artificial intelligence in educational technology research: A bibliometric approach. *Journal of Educational Computing Research*. https://doi.org/10.1177/07356331241278636

Costa, D., Pereira, M., & Ivanov, S. (2024). Artificial intelligence applications in regional development research: A bibliometric study. *Algorithms, 17*(9), 418. https://doi.org/10.3390/a17090418

Davenport, T. H., & Ronanki, R. (2018). Artificial intelligence for the real world. *Harvard Business Review, 96*(1), 108–116.

De la Vega Hernández, I. M., Urdaneta, A. S., et al. (2023). Global bibliometric mapping of the frontier of knowledge in the field of artificial intelligence for the period 1990–2019. *Artificial Intelligence Review, 56*, 12345–12370. https://doi.org/10.1007/s10462-022-10206-4

Demir, K., & Kaya, S. (2020). Big data and artificial intelligence domains: A bibliometric analysis. *International Journal on E-Learning, 19*(4), 345–362.

Dhamija, P., & Bag, S. (2020). Role of artificial intelligence in operations environment: A review and bibliometric analysis. *The TQM Journal, 32*(4), 869–896. https://doi.org/10.1108/TQM-10-2019-0243

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N., & Lim, W. M. (2021). How to conduct a bibliometric analysis: An overview and guidelines. *Journal of Business Research, 133*, 285–296. https://doi.org/10.1016/j.jbusres.2021.04.070

Durak, G., Çankaya, S., Özdemir, D., & Can, S. (2024). Artificial intelligence in education: A bibliometric study on its role in transforming teaching and learning. *International Review of Research in Open and Distributed Learning, 25*(3), 145–166.

Dwivedi, Y. K., Hughes, L., Baabdullah, A. M., et al. (2023). So what if ChatGPT wrote it? Multidisciplinary perspectives on opportunities, challenges and implications of generative conversational AI for research, practice and policy. *Sustainability, 15*(17), 12983. https://doi.org/10.3390/su151712983

Dwivedi, Y. K., Hughes, L., Ismagilova, E., et al. (2021). Artificial Intelligence (AI): Multidisciplinary perspectives on emerging challenges, opportunities, and agenda for research, practice and policy. *International Journal of Information Management, 57*, 101994.

El-Hajj, V. G., Gharios, M., Edström, E., & Elmi-Terander, A. (2023). Artificial intelligence in neurosurgery: A bibliometric analysis. *World Neurosurgery, 170*, 218–228. https://doi.org/10.1016/j.wneu.2022.11.104

Espina-Romero, L., Norono Sanchez, J. G., et al. (2023). Which industrial sectors are affected by artificial intelligence? A bibliometric analysis of trends and perspectives. *Sustainability, 15*(16), 12176. https://doi.org/10.3390/su151612176

Esteva, A., Kuprel, B., Novoa, R. A., Ko, J., Swetter, S. M., Blau, H. M., & Thrun, S. (2017). Dermatologist-level classification of skin cancer with deep neural networks. *Nature, 542*(7639), 115–118. https://doi.org/10.1038/nature21056

Floridi, L., Cowls, J., Beltrametti, M., Chatila, R., Chazerand, P., Dignum, V., Luetge, C., Madelin, R., Pagallo, U., Rossi, F., Schafer, B., Valcke, P., & Vayena, E. (2018). AI4People—An ethical framework for a good AI society: Opportunities, risks, principles, and recommendations. *Minds and Machines, 28*(4), 689–707. https://doi.org/10.1007/s11023-018-9482-5

Fu, H. Z., Wang, M. H., & Ho, Y. S. (2022). Mapping the scientific research on artificial intelligence in healthcare: A bibliometric analysis. *Healthcare, 10*(5), 879. https://doi.org/10.3390/healthcare10050879

Gao, F., Jia, X., Zhao, Z., Chen, C. C., Xu, F., Geng, Z., et al. (2021). Bibliometric analysis on tendency and topics of artificial intelligence over last decade. *Microsystem Technologies, 27*(4), 1545–1557. https://doi.org/10.1007/s00542-019-04426-y

Gao, H., & Ding, X. (2022). The research landscape on artificial intelligence: A bibliometric analysis of recent 20 years. *Multimedia Tools and Applications, 81*(22), 32195–32224. https://doi.org/10.1007/s11042-022-12208-4

García, J., Martínez, P., & López, R. (2022). Artificial intelligence techniques in innovation project management: A bibliometric review. *Applied Sciences, 12*(22), 11743. https://doi.org/10.3390/app122211743

Gómez, L., & Silva, P. (2024). Fuzzy logic and artificial intelligence: An interdisciplinary bibliometric analysis. *Mathematics, 12*(5), 782. https://doi.org/10.3390/math12050782

Goodfellow, I., Bengio, Y., & Courville, A. (2016). *Deep learning*. MIT Press.

Gordon, M., et al. (2024). Generative artificial intelligence in medical education: Opportunities and challenges. *Medical Teacher, 46*(2), 120–128.

Gu, J., Gao, C., & Wang, L. (2023). The evolution of artificial intelligence in biomedicine: Bibliometric analysis. *JMIR AI, 2*(1), e45770. https://doi.org/10.2196/45770

Guembe, B., Misra, S., Azeta, A., et al. (2025). Bibliometric analysis of artificial intelligence cyberattack detection models. *Artificial Intelligence Review*. https://doi.org/10.1007/s10462-025-11167-0

Guo, Y., Hao, Z., Zhao, S., Gong, J., & Yang, F. (2020). Artificial intelligence in health care: Bibliometric analysis. *Journal of Medical Internet Research, 22*(7), e18228. https://doi.org/10.2196/18228

Gupta, R., & Sharma, P. (2025). Artificial intelligence and emerging research trends: A bibliometric analysis. *Discover Artificial Intelligence*. https://doi.org/10.1007/s43621-025-01222-9

Han, W., Li, Y., & Zhang, X. (2024). A bibliometric analysis of artificial intelligence in language teaching and learning (1990–2023): Evolution, trends and future directions. *Education and Information Technologies*. https://doi.org/10.1007/s10639-024-12848-z

Hanna, M. G., et al. (2024). Artificial intelligence applications in pathology and diagnostics. *Modern Pathology, 37*(1), 55–68.

Hassan, M., & Ali, K. (2023). Artificial intelligence in cybersecurity research: A bibliometric analysis. *Mesopotamian Journal of CyberSecurity, 2023*(1), 45–59.

Hinojo-Lucena, F. J., Aznar-Díaz, I., Cáceres-Reche, M. P., & Romero-Rodríguez, J. M. (2019). Artificial intelligence in higher education: A bibliometric study on its impact in the scientific literature. *Education Sciences, 9*(1), 51. https://doi.org/10.3390/educsci9010051

Ho, Y. S., & Satoh, H. (2021). Bibliometric study of Applied Artificial Intelligence journal. *COLLNET Journal of Scientometrics and Information Management, 15*(2), 245–260. https://doi.org/10.1080/09737766.2021.1938742

Ho, Y. S., & Wang, M. H. (2020). A bibliometric analysis of artificial intelligence publications from 1991 to 2018. *COLLNET Journal of Scientometrics and Information Management, 14*(2), 369–392. https://doi.org/10.1080/09737766.2021.1918032

Holmes, W., Bialik, M., & Fadel, C. (2019). *Artificial intelligence in education: Promises and implications for teaching and learning*. Center for Curriculum Redesign.

Huang, J., Zhang, Y., Li, X., & Wang, L. (2023). Global research trends in artificial intelligence: A bibliometric and visualized study. *Scientometrics, 128*(4), 2451–2476.

Huang, M. H., & Rust, R. T. (2021). A strategic framework for artificial intelligence in marketing. *Journal of the Academy of Marketing Science, 49*(1), 30–50.

Ilić, L., Šijan, A., Predić, B., Viduka, D., & Karabašević, D. (2024). Research trends in artificial intelligence and security—Bibliometric analysis. *Electronics, 13*(12), 2288. https://doi.org/10.3390/electronics13122288

Ionescu, Ș., Delcea, C., Chiriță, N., & Nica, I. (2024). Exploring the use of artificial intelligence in agent-based modeling applications: A bibliometric study. *Algorithms, 17*(1), 21. https://doi.org/10.3390/a17010021

Islam, M. N., & Guangwei, H. (2025). Trends and patterns of artificial intelligence research in libraries: A bibliometric analysis. *SAGE Open, 15*(1). https://doi.org/10.1177/21582440251327528

Ivanova, M., Grosseck, G., & Holotescu, C. (2024). Unveiling insights: A bibliometric analysis of artificial intelligence in teaching. *Informatics, 11*(1), 10. https://doi.org/10.3390/informatics11010010

Jia, K., Wang, P., Li, Y., Chen, Z., Jiang, X., Lin, C. L., & Chao, C. M. (2022). Research landscape of artificial intelligence and e-learning: A bibliometric research. *Frontiers in Psychology, 13*, 795039. https://doi.org/10.3389/fpsyg.2022.795039

Jimma, B. L. (2023). Artificial intelligence in healthcare: A bibliometric analysis. *Telematics and Informatics Reports, 9*, 100041. https://doi.org/10.1016/j.teler.2023.100041

Jordan, M. I., & Mitchell, T. M. (2015). Machine learning: Trends, perspectives, and prospects. *Science, 349*(6245), 255–260.

Jrad, M. (2023). A role of artificial intelligence in the context of economy: Bibliometric analysis and systematic literature review. *International Journal of Membrane Science and Technology, 10*(2), 1–15.

Kaplan, A., & Haenlein, M. (2020). Rulers of the world, unite! The challenges and opportunities of artificial intelligence. *Business Horizons, 63*(1), 37–50. https://doi.org/10.1016/j.bushor.2019.09.003

Khan, M., Ali, R., & Ahmed, S. (2025). Artificial intelligence in public administration: A bibliometric study. *Public Administration Review, 85*(1), 88–104.

Khan, M., Ali, S., & Hussain, T. (2023). Machine learning and ecotechnology for sustainable development: A bibliometric review. *Environmental and Sustainability Indicators, 20*, 100301. https://doi.org/10.1016/j.indic.2023.100301

Kim, S., & Park, J. (2024). Artificial intelligence studies in education: A bibliometric review. *Sustainability, 16*(16), 6724. https://doi.org/10.3390/su16166724

Knani, M., Echchakoui, S., & Ladhari, R. (2022). Artificial intelligence in tourism and hospitality: Bibliometric analysis and research agenda. *International Journal of Hospitality Management, 107*, 103317. https://doi.org/10.1016/j.ijhm.2022.103317

Kumar, A., Singh, P., & Sharma, V. (2024). Artificial intelligence and cultural heritage research: A bibliometric analysis. *Digital Library Perspectives, 40*(4), 609–628. https://doi.org/10.1108/DLP-02-2024-0015

Kumar, R., Sharma, P., Singh, A., & Verma, S. (2024). Artificial intelligence in healthcare diagnostics: A bibliometric analysis. *Discover Artificial Intelligence, 4*(1), 114. https://doi.org/10.1007/s44163-024-00114-7

Kumar, V., Ramachandran, D., & Gupta, S. (2021). The impact of artificial intelligence on branding: A bibliometric study. *International Journal of E-Business Research, 17*(4), 1–19. https://doi.org/10.4018/IJEBR.2021100101

Lee, J., Kim, S., & Park, H. (2022). Economics and artificial intelligence research overlap: A bibliometric analysis. *Pacific Asia Journal of the Association for Information Systems, 14*(2), 145–167.

Lei, Y., & Liu, Z. (2019). The development of artificial intelligence: A bibliometric analysis, 2007–2016. *Journal of Physics: Conference Series, 1168*(2), 022027. https://doi.org/10.1088/1742-6596/1168/2/022027

Li, K. C., & Wong, B. T. M. (2023). Artificial intelligence in personalised learning: A bibliometric analysis. *Interactive Technology and Smart Education, 20*(3), 422–439. https://doi.org/10.1108/ITSE-10-2022-0171

Li, X., Zhang, H., Wang, Y., et al. (2024). Artificial intelligence applied to wastewater treatment: Visualization and bibliometric analysis. *Journal of Water Process Engineering, 62*, 105441. https://doi.org/10.1016/j.jwpe.2024.105441

Li, Y., Wang, H., & Zhao, X. (2025). Artificial intelligence and cybersecurity research: A bibliometric review. *Cryptography, 9*(1), 17. https://doi.org/10.3390/cryptography9010017

Li, Y., Zhang, H., & Wang, Q. (2025). Artificial intelligence and labor market research: A bibliometric review. *The Extractive Industries and Society, 18*, 101583. https://doi.org/10.1016/j.exis.2025.101583

Lin, M., Lin, L., Lin, L., Lin, Z., & Yan, X. (2025). A bibliometric analysis of the advance of artificial intelligence in medicine. *Frontiers in Medicine, 12*, 1504428. https://doi.org/10.3389/fmed.2025.1504428

Lin, Y., & Yu, Z. (2024). A bibliometric analysis of artificial intelligence chatbots in educational contexts. *Interactive Technology and Smart Education, 21*(2), 189–210. https://doi.org/10.1108/ITSE-07-2023-0123

Liu, Z., Wang, S., Zhang, Y., Feng, Y., Liu, J., & Zhu, H. (2023). Artificial intelligence in food safety: A decade review and bibliometric analysis. *Foods, 12*(6), 1242. https://doi.org/10.3390/foods12061242

Luckin, R., Holmes, W., Griffiths, M., & Forcier, L. B. (2016). *Intelligence unleashed: An argument for AI in education*. Pearson Education.

Martins, J., & Oliveira, T. (2024). Artificial intelligence innovation and research trends: A bibliometric study. *The Journal of Technology Transfer*. https://doi.org/10.1007/s10961-024-10165-8

Metli, A. (2023). Articles on education and artificial intelligence: A bibliometric analysis. *Journal of Social Sciences and Education, 6*(2), 145–160.

Min, H. (2021). Artificial intelligence applications in supply chain management: A systematic review and bibliometric analysis. *Expert Systems with Applications, 181*, 115101. https://doi.org/10.1016/j.eswa.2021.115101

Munim, Z. H., Dushenko, M., Jimenez, V. J., et al. (2020). Big data and artificial intelligence in the maritime industry: A bibliometric review and future research directions. *Maritime Policy & Management, 47*(5), 577–597. https://doi.org/10.1080/03088839.2020.1788731

Nalbant, K. G., & Aydin, S. (2025). A bibliometric approach to the evolution of artificial intelligence in digital marketing. *International Marketing Review, 42*(2–3), 179–198. https://doi.org/10.1108/IMR-09-2023-0214

Obreja, D. M., Rughiniș, R., & Rosner, D. (2024). Mapping the conceptual structure of innovation in artificial intelligence research: A bibliometric analysis and systematic literature review. *Journal of Innovation & Knowledge, 9*(2), 100479. https://doi.org/10.1016/j.jik.2024.100479

Okeke, C., & Adeyemi, T. (2023). Natural language processing and artificial intelligence research in Africa: A bibliometric analysis. *Discover Artificial Intelligence, 3*(1), 84. https://doi.org/10.1007/s44163-023-00084-2

Patel, R., & Mehta, S. (2025). Artificial intelligence and knowledge management systems: A bibliometric evaluation. *VINE Journal of Information and Knowledge Management Systems, 55*(3), 710–728. https://doi.org/10.1108/VJIKMS-11-2023-0421

Prahani, B., Rizki, I., Jatmiko, B., Suprapto, N., et al. (2022). Artificial intelligence in education research during the last ten years: A review and bibliometric study. *International Journal of Emerging Technologies in Learning, 17*(8), 250–266.

Prasetyo, H. (2024). Artificial intelligence in vocational education in Indonesia: A bibliometric study. *ASEAN Journal of Science and Engineering Education, 4*(2), 120–135.

Rodrigues, P., & Silva, M. (2024). Artificial intelligence in customer acquisition: A bibliometric analysis. In *Artificial Intelligence Applications in Marketing* (pp. 112–129). IGI Global.

Romero-Riaño, E., Rico-Bautista, D., et al. (2021). Artificial intelligence theory: A bibliometric analysis. *Journal of Physics: Conference Series, 2046*(1), 012078. https://doi.org/10.1088/1742-6596/2046/1/012078

Russell, S., & Norvig, P. (2021). *Artificial intelligence: A modern approach* (4th ed.). Pearson.

Sharma, A., Gupta, P., & Singh, R. (2023). Artificial intelligence and machine learning applications in banking, financial services, and insurance: A bibliometric review. *Heliyon, 9*(12), e22017. https://doi.org/10.1016/j.heliyon.2023.e22017

Sharma, P., Gupta, S., & Kumar, R. (2022). Operations research and artificial intelligence applications in sustainable food systems: A bibliometric analysis. *Frontiers in Sustainable Food Systems, 6*, 1053921. https://doi.org/10.3389/fsufs.2022.1053921

Shukla, A. K., Janmaijaya, M., Abraham, A., & Muhuri, P. K. (2019). Engineering applications of artificial intelligence: A bibliometric analysis of 30 years (1988–2018). *Engineering Applications of Artificial Intelligence, 85*, 517–532. https://doi.org/10.1016/j.engappai.2019.06.010

Silva, M., Costa, P., & Rodrigues, A. (2024). Artificial intelligence in anesthesiology: A bibliometric analysis. *BioMedical Engineering Online, 23*(1), 80. https://doi.org/10.1186/s13741-024-00480-x

Silva, M., Costa, R., & Oliveira, P. (2025). Artificial intelligence in finance research: A bibliometric overview. *AI & Society, 40*(1), 55–74.

Silva, R., & Torres, M. (2024). Artificial intelligence research output and bibliometric analysis using Scopus database. *Global Knowledge, Memory and Communication*. https://doi.org/10.1007/s40497-024-00385-5

Song, P., & Wang, X. (2020). A bibliometric analysis of worldwide educational artificial intelligence research development in recent twenty years. *Asia Pacific Education Review, 21*(3), 473–486. https://doi.org/10.1007/s12564-020-09640-2

Tang, R., Zhang, S., Ding, C., Zhu, M., & Gao, Y. (2022). Artificial intelligence in intensive care medicine: Bibliometric analysis. *Journal of Medical Internet Research, 24*(11), e42185. https://doi.org/10.2196/42185

Tekin, U., & Dener, M. (2025). A bibliometric analysis of studies on artificial intelligence in neuroscience. *Frontiers in Neurology, 16*, 1474484. https://doi.org/10.3389/fneur.2025.1474484

Thayyib, P. V., Mamilla, R., Khan, M., Fatima, H., Asim, M., et al. (2023). State-of-the-art of artificial intelligence and big data analytics reviews in five different domains: A bibliometric summary. *Sustainability, 15*(5), 4026. https://doi.org/10.3390/su15054026

Topol, E. (2019). *Deep medicine: How artificial intelligence can make healthcare human again*. Basic Books.

Tran, B. X., Vu, G. T., Ha, G. H., Vuong, Q. H., Ho, M. T., et al. (2019). Global evolution of research in artificial intelligence in health and medicine: A bibliometric study. *Journal of Clinical Medicine, 8*(3), 360. https://doi.org/10.3390/jcm8030360

Triansyah, F. A., Muhammad, I., et al. (2023). Bibliometric analysis: Artificial intelligence (AI) in high school education. *Jurnal Ilmiah Pendidikan dan Pembelajaran, 7*(2), 245–256.

Vasishta, P., Dhingra, N., & Vasishta, S. (2025). Application of artificial intelligence in libraries: A bibliometric analysis and visualisation of research activities. *Library Hi Tech, 43*(2–3), 693–712. https://doi.org/10.1108/LHT-10-2023-0492

Wang, J., Liang, Y., Cao, S., Cai, P., & Fan, Y. (2023). Application of artificial intelligence in geriatric care: Bibliometric analysis. *Journal of Medical Internet Research, 25*, e46014. https://doi.org/10.2196/46014

Wang, Y., Chen, X., Li, J., et al. (2022). Artificial intelligence in public health research: A bibliometric analysis. *Frontiers in Public Health, 10*, 933665. https://doi.org/10.3389/fpubh.2022.933665

Wang, Y., Li, Z., & Chen, X. (2024). Artificial intelligence in applied linguistics: A bibliometric analysis. *System, 122*, 103255.

Xiao, G., Yang, D., Xu, L., Li, J., & Jiang, Z. (2024). The application of artificial intelligence technology in shipping: A bibliometric review. *Journal of Marine Science and Engineering, 12*(4), 624. https://doi.org/10.3390/jmse12040624

Xie, B., Xu, D., Zou, X. Q., Lu, M. J., Peng, X. L., & Wen, X. J. (2024). Artificial intelligence in dentistry: A bibliometric analysis from 2000 to 2023. *Journal of Dental Sciences, 19*(2), 1020–1031. https://doi.org/10.1016/j.jds.2023.11.021

Zhang, L., Ling, J., & Lin, M. (2022). Artificial intelligence in renewable energy: A comprehensive bibliometric analysis. *Energy Reports, 8*, 14072–14088. https://doi.org/10.1016/j.egyr.2022.10.393

Zhang, Q., Li, H., Wang, Y., et al. (2023). Artificial intelligence in diabetic retinopathy research: A bibliometric analysis. *Computer Methods and Programs in Biomedicine, 231*, 107363. https://doi.org/10.1016/j.cmpb.2023.107363

Zhang, X. (2024). Artificial intelligence in lung cancer research: A bibliometric analysis. *Heliyon, 10*(5), e26096. https://doi.org/10.1016/j.heliyon.2024.e26096

Zhang, Y. (2022). Advancements of artificial intelligence in sustainable development: A bibliometric review. *Sustainability, 14*(16), 10230. https://doi.org/10.3390/su141610230

Zhang, Y., Liu, X., & Wang, H. (2024). Artificial intelligence and crowd intelligence in public sector research: A bibliometric analysis. *Government Information Quarterly, 41*(4), 101942. https://doi.org/10.1016/j.giq.2024.101942

Zhao, L., Wang, J., & Liu, Y. (2023). Artificial intelligence technologies in traffic flow prediction: A bibliometric analysis. *Expert Systems with Applications, 230*, 120618. https://doi.org/10.1016/j.eswa.2023.120618

Zupic, I., & Čater, T. (2015). Bibliometric methods in management and organization. *Organizational Research Methods, 18*(3), 429–472.

TARK TANSAKU
ISSN: (Applied)
Volume 1, Issue 1, March 2026
DOI:

The Mundaka Upanishad and Contemporary Well-Being: A Philosophical Framework for Stress Management, Values and Spiritual Balance

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Abstract: This paper examines how the Mundaka Upanishad (मुंडक उपनिषद) can help deal with major problems of modern life, such as stress, weakening values and lack of inner balance. It describes two types of knowledge: Para Vidya (परा विद्या) (higher spiritual knowledge) and Apara Vidya (अपरा विद्या) (worldly knowledge) and shows that too much focus on material success can create dissatisfaction. Using a conceptual approach, the study connects important Upanishadic ideas like self-awareness, detachment and the unity of Atman (आत्मा) and Brahman (ब्रह्म) with modern views on stress management and well-being. The study finds that spiritual understanding helps improve emotional stability, encourages ethical behaviour and supports overall well-being. It also presents a conceptual model showing how spiritual knowledge promotes psychological balance, reduces stress and supports integrated living. The paper further discusses how these ideas can be applied in education, workplaces and mental health practices. The paper concludes that combining Upanishadic wisdom with modern psychology provides a practical and holistic way to achieve well-being in today's world. However, the study remains conceptual in nature and requires future empirical validation.

Keywords: Mundaka Upanishad; Vedanta; stress management; spiritual balance; values; self-realisation.

1. Introduction:

1.1 Background of the Study

In the modern era, human life is marked by increasing psychological stress, ethical dilemmas and a growing imbalance between material success and inner well-being. Rapid urbanisation, technological progress and highly competitive lifestyles have increased mental pressure and led

to concerns such as anxiety, burnout and decline in values. Recent global reports show the seriousness of the problem. Around 48% of employees worldwide report experiencing burnout at work, while more than half of workers face high levels of stress. In addition, about 41% of employees report feeling stressed for a significant part of the day, which indicates a growing mental health concern in workplaces. Recent research also shows that mindfulness and reflective consciousness practices significantly reduce stress and improve emotional well-being in modern work environments (Bartlett et al., 2021).

Modern approaches to wellbeing, especially in stress management, focus on cognitive and behavioural methods. These methods provide useful support but often address only surface-level symptoms rather than deeper human concerns related to meaning and purpose. In contrast, ancient Indian philosophy offers a holistic view of life that integrates mental, ethical and spiritual dimensions.

The *Mundaka Upanishad*, a key text of *Vedanta*, explains the nature of knowledge, reality and self-realisation. It presents a clear distinction between *Apara Vidya***,** which refers to worldly knowledge and *Para Vidya***,** which refers to higher spiritual knowledge. The text emphasises that true fulfilment does not arise from external success but from the realisation of ultimate reality known as *Brahman***.** This framework is highly relevant today because many individuals achieve external success without attaining psychological balance. The teachings of the *Mundaka Upanishad* promote detachment, self-inquiry and the pursuit of higher knowledge as paths to inner harmony. These ideas connect closely with modern concepts such as mindfulness, resilience and ethical living and show that ancient wisdom can address present challenges.

1.2 Rationale of the Study

Despite progress in psychology and behavioural science, stress-related problems continue to increase. This indicates the need for deeper approaches that include values and inner development. Modern systems often focus on performance and productivity but give less attention to ethical grounding and spiritual balance. The *Mundaka Upanishad* offers an integrated framework of knowledge, values and spirituality. Its teachings are practical and relevant for daily life, including stress reduction, decision-making and moral development. However, academic research rarely applies these teachings in a structured way to modern issues such as stress and value formation. This study aims to fill this gap by examining how the insights of the *Mundaka Upanishad* can be applied in present contexts.

1.3 Problem Statement

Modern society faces a complex crisis with rising stress, weak value systems and a lack of spiritual direction. Existing approaches are often fragmented and do not address the root causes of dissatisfaction. There is a need for an integrated framework that connects psychological well-being with ethical and spiritual development.

1.4 Objectives of the Study

The study is guided by the following objectives:

1. To analyse the key philosophical teachings of the *Mundaka Upanishad*
2. To examine its relevance for modern stress and mental well-being

3. To explore its role in the development of ethical values
4. To evaluate its contribution to spiritual balance in contemporary life

1.5 Significance of the Study

This study has both theoretical and practical value. At the theoretical level, it contributes to interdisciplinary research by linking Indian philosophy with modern psychology and ethics. It strengthens understanding of how spiritual knowledge can support human well-being. At the practical level, the study offers useful insights for education organisations and mental health practices. The teachings of the *Mundaka Upanishad*, such as introspective understanding, detachment and higher knowledge, can help individuals build resilience, clarity and psychological balance.

2. Literature Review

2.1 Classical Interpretations of the Mundaka Upanishad

Classical commentaries form the foundation for understanding the *Mundaka Upanishad*. The works of Adi Shankaracharya provide a central interpretation where the distinction between *Para Vidya* and *Apara Vidya* is key to the realisation of *Brahman*. He argues that liberation depends on knowledge of ultimate reality rather than ritual or empirical learning. The *Mundaka Upanishad* uses symbolic ideas such as two birds on a tree to show the difference between the empirical self and the higher self.

Critical Analysis: Classical interpretations offer deep philosophical insight but focus mainly on spiritual liberation. They do not directly address modern issues such as stress or ethical decline. Their abstract nature limits practical use in present contexts. This creates a need for reinterpretation that connects philosophical depth with everyday life.

2.2 Modern Interpretations and Philosophical Perspectives

Modern scholars such as Eknath Easwaran and Chandradhar Sharma present the Upanishads in a more practical form. Easwaran explains the teachings as guides for daily life with a focus on meditation discipline and ethical awareness. Sharma places the philosophy within *Vedanta* and highlights its contribution to knowledge and reality. Bina Gupta extends this discussion by showing that ideas such as detachment and self-realisation have universal relevance.

Critical Analysis: Modern interpretations improve accessibility but remain largely descriptive. They explain ideas clearly but do not connect them with measurable outcomes such as stress reduction or behaviour change. There is a need for structured models that link philosophy with empirical realities.

2.3 Spirituality and Stress Management: Psychological Perspectives

Contemporary psychology recognises the role of spirituality and mindfulness in well-being. Jon Kabat-Zinn shows that awareness and non-attachment reduce stress. Sara Lazar provides evidence that meditation affects brain structures related to emotional control. Martin Seligman

highlights meaning and purpose as key elements of well-being. These ideas align with Upanishadic thought, which gives priority to inner realisation over external success.

Contemporary global psychological research further strengthens the relevance of inner awareness and intrinsic motivation in human well-being. The Self-Determination Theory (Deci & Ryan, 2000) suggests that autonomy, competence and relatedness are essential psychological needs that contribute to well-being and reduced stress. Similarly, Diener (2000) highlights the concept of subjective well-being, while Ryff (1989) proposes a multidimensional model of psychological well-being that includes self-acceptance, purpose in life and personal growth. These perspectives align closely with the teachings of the *Mundaka Upanishad*, which emphasise inner meaningful existence, self-realisation and detachment from purely material pursuits as the foundation of a balanced and meaningful life.

Critical Analysis: Psychology supports the benefits of mindfulness but often treats spirituality in a limited and secular way. It does not include deeper ideas such as the unity of *Atman* and *Brahman*. As a result, it lacks the holistic depth present in Upanishadic philosophy. This indicates the potential for integration between ancient wisdom and modern science. Recent research further confirms that mindfulness-based interventions enhance psychological resilience and reduce burnout in high-stress environments (Lomas et al., 2022).

2.4 Value Systems and Ethical Living

The decline of ethical values is a major concern in modern society. Daniel Goleman links emotional intelligence with ethical behaviour, while education research supports value-based learning. The *Mundaka Upanishad* promotes values such as truth, discipline and knowledge. These values arise from self-understanding rather than external rules.

Critical Analysis: Modern value education often focuses on behaviour without a deeper philosophical grounding. The Upanishadic approach links ethics with self-knowledge, which makes values internal and stable. The challenge lies in applying these ideas in practical systems like education and organisations.

2.5 Integration of Spirituality and Contemporary Life

Recent studies attempt to combine spirituality with fields such as leadership, mental health and education. Ideas like spiritual intelligence and integrated human development show growing interest in inner balance. The *Mundaka Upanishad* offers an integrated model of knowledge, values and self-realisation. Its focus on detachment and awareness aligns with modern ideas of resilience and emotional stability.

Critical Analysis: Many studies adopt spiritual ideas without a strong grounding in classical texts. This leads to shallow understanding and weak application. A deeper engagement with sources is necessary for meaningful integration.

2.6 Research Gap

The review shows the following gaps:

- Limited integration of Upanishadic philosophy with modern stress frameworks

- Lack of structured models linking spiritual knowledge with well-being
- Insufficient focus on value formation through philosophical insight
- Absence of interdisciplinary work connecting philosophy, psychology and ethics

The literature shows that ancient philosophy and modern psychology both offer useful insights, but often remain separate. Classical interpretations provide depth while modern research offers empirical support. However, a unified framework is missing. This study addresses this gap by linking the teachings of the *Mundaka Upanishad* with contemporary issues of stress, values and spiritual balance and by proposing an integrated approach for contemporary society. This study addresses this gap by proposing a structured conceptual linkage between Upanishadic knowledge systems and contemporary models of stress, values and well-being.

3. Research Methodology

This study adopts a qualitative and conceptual research design grounded in interpretive and thematic analysis. The research is exploratory in nature and seeks to study the relevance of the *Mundaka Upanishad* in dealing with modern-day issues such as stress, moral values and spiritual well-being. The study relies on secondary data sources, including the original Upanishadic text, classical commentaries (e.g., Shankaracharya) and contemporary literature in psychology and ethics. A thematic analysis approach is employed to identify key philosophical constructs such as *Para Vidya*, *Apara Vidya*, detachment and self-realisation. These constructs are systematically categorised into broader analytical themes, including stress reduction, ethical internalisation and multidimensional well-being. The validity of the analysis is ensured through theoretical triangulation by aligning philosophical interpretations with established psychological frameworks. However, the study remains conceptual in nature and does not involve empirical validation. The study does not aim to generalise findings but rather to provide a conceptual and theoretical framework for future empirical research. Existing studies rarely examine the *Mundaka Upanishad* through an integrated interdisciplinary framework combining philosophy, psychology and well-being studies.

4. Conceptual Analysis and Discussion

4.1 Thematic Foundations of the Mundaka Upanishad in Contemporary Context

A careful interpretation of the *Mundaka Upanishad* shows that it offers a well-organised philosophical framework that can help address many challenges of modern human life. The thematic analysis of the text highlights four important and interconnected dimensions:

(i) Duality of knowledge,

(ii) Causes and management of stress,

(iii) Internalisation of values and

(iv) Spiritual balance.

One of the central ideas of the *Mundaka Upanishad* is the distinction between *Apa*ra Vidya (worldly or empirical knowledge) and *Para Vidya* (spiritual and self-realising knowledge) (Shankaracharya, 2006; Radhakrishnan, 1994).

The distinction between higher and lower knowledge is explicitly stated in the *Mundaka Upanishad* (1.1.4–5):

"द्वे विद्ये वेदितव्ये इति ह स्म यद्ब्रह्मविदो वदन्ति परा चैवापरा च॥"

(Dve vidye veditavye iti ha sma yad brahmavido vadanti para chaivapara cha.)

("Two kinds of knowledge are to be known: the higher (Para) and the lower (Apara).")

This mantra establishes the epistemological foundation of the text and highlights the importance of balancing worldly knowledge with spiritual understanding.

This distinction forms the epistemological foundation of the text. In the modern world, greater importance is often given to *Apara Vidya*, which is reflected in performance-driven education systems, competition and the pursuit of material success. Such excessive focus frequently results in stress, anxiety and a sense of emptiness.

In contrast, *Para Vidya* promotes self-awareness, inner understanding and clarity about the true nature of existence. It helps individuals achieve lasting peace and well-being. Therefore, the dual concept of knowledge presented in the *Mundaka Upanishad* offers a meaningful perspective for understanding the imbalance between external achievements and inner fulfilment in contemporary society (Gupta, 2012).

4.2 Knowledge Duality and The Crisis of Modern Achievement

The excessive importance given to *Apara Vidya* in modern social and economic systems has created an imbalance in human life. As a result, many individuals achieve professional and material success but fail to attain existential harmony and psychological resilience. This situation reflects what modern psychology describes as a "meaning deficit," where external achievements do not necessarily lead to happiness or personal satisfaction (Seligman, 2011; Diener, 2000).

According to the *Mundaka Upanishad*, knowledge limited only to worldly and empirical matters cannot fully address essential human concerns such as identity, purpose and enduring satisfaction (Sharma, 2000). The inclusion of *Para Vidya* introduces reflective consciousness and deeper understanding, helping individuals move beyond socially constructed identities and cultivate enduring inner contentment.

This idea is closely related to the principles of Self-Determination Theory, which highlights autonomy, meaning and inner motivation as important factors for psychological well-being (Deci & Ryan, 2000). Therefore, the dual concept of knowledge presented in the *Mundaka Upanishad* provides a valuable alternative to modern achievement-oriented approaches that focus mainly on external success. The imbalance between external achievement and inner fulfilment also becomes a major cause of stress.

4.3 Stress Management: From Symptom Regulation to Ontological Transformation

Modern approaches to stress management, especially mindfulness-based practices, have been found effective in reducing psychological stress and improving emotional control (Kabat-Zinn, 2003; Bartlett et al., 2021; Lomas et al., 2022). However, many of these approaches mainly focus on managing symptoms rather than addressing the deeper existential causes of stress.

In contrast, the *Mundaka Upanishad* explains that the real causes of suffering are avidya (ignorance) and attachment (Shankaracharya, 2006). The text emphasises *vairagya* (detachment) and self-inquiry as important means for overcoming mental suffering.

The *Mundaka Upanishad* further states:

"परिक्ष्य लोकान् कर्मचितान् ब्राहमणो निर्वेदमायात्॥"

(Parikshya lokan karmachitan brahmano nirvedamayat.)

(*Mundaka Upanishad* 1.2.12)

("After examining worldly achievements obtained through action, the wise develop detachment.")

This verse highlights the limitations of externally driven pursuits and supports the transition from material attachment toward self-inquiry and spiritual awareness.

Through these practices, individuals gradually free themselves from identities and expectations based only on external success and outcomes. This process brings about a deeper transformation in consciousness and understanding of the self.

Unlike approaches that focus only on emotional control, the Upanishadic perspective aims at a complete reorientation of human existence and awareness. It encourages individuals to realise their true nature and develop inner stability that is independent of external conditions.

Recent findings in neuroscience also support the value of contemplative practices. Research shows that such practices can create structural and functional changes in brain regions related to emotional regulation, attention and self-awareness (Lazar et al., 2005). Therefore, the stress management approach found in the *Mundaka Upanishad* not only complements modern psychological methods but also provides a deeper solution by addressing the root causes of stress rather than only its symptoms.

Unlike modern achievement frameworks that often measure success through external performance indicators, the *Mundaka Upanishad* critiques the instability of identity constructed through social recognition and material acquisition. Contemporary systems encourage continuous competition and productivity, whereas Vedantic thought emphasises detachment from externally conditioned self-worth. This philosophical contrast reveals that the crisis of modern achievement is not merely psychological but ontological in nature.

4.4 Value Formation and Ethical Internalisation

Modern society is increasingly experiencing a decline in moral and ethical values. Although external rules, laws and regulations are used to maintain ethical behaviour, they often fail to create genuine moral commitment among individuals (Goleman, 1998). In contrast, the *Mundaka Upanishad* presents an inner and self-based approach to value formation.

According to Vedantic philosophy, ethical behaviour naturally develops when a person realises his or her true nature (Radhakrishnan, 1994). Values such as *satya* (truth), *tapas* (discipline) and *jnana* (knowledge) are not imposed from outside but are realised internally through self-awareness and spiritual understanding. This inner realisation leads to authenticity in behaviour and strengthens moral character.

This idea is similar to modern theories of psychological well-being, especially Ryff's (1989) model, which highlights self-acceptance, purpose in life and personal growth as important aspects of human development. Likewise, the theory of emotional intelligence emphasises that self-awareness plays a major role in ethical thinking and decision-making (Goleman, 1998). Therefore, the Upanishadic approach provides both a philosophical and psychological basis for sustainable value formation in contemporary society.

4.5 Spiritual Balance and Holistic Well-Being

The concept of spiritual balance in the *Mundaka Upanishad* is based on the realisation of the unity between *Atman* (the individual self) and *Brahman* (ultimate reality).

This spiritual unity is expressed in the following declaration from the *Mundaka Upanishad*:

"ब्रह्मैवेदममृतं पुरस्ताद् ब्रह्म पश्चाद् ब्रह्म दक्षिणतश्चोत्तरेण ।
अधश्चोर्ध्वं च प्रसृतं ब्रह्मैवेदं विश्वमिदं वरिष्ठम्॥"

(Brahmaivedamamritam purastad brahma pashchad brahma dakshinataschottarena ।
Adhashchordhvam cha prasritam brahmaivedam vishvamidam varishtham॥)

(*Mundaka Upanishad* 2.2.11)

The verse symbolises the all-pervading nature of *Brahman* and represents the highest state of existential harmony and spiritual integration.

This realisation creates a state of harmony in which the mental, emotional and spiritual dimensions of life become integrated and balanced (Shankaracharya, 2006).

Unlike many modern approaches to well-being that focus mainly on physical health or psychological comfort, the Upanishadic perspective offers a holistic understanding of human well-being. It recognises that true happiness and fulfilment arise from harmony between the inner self and the external world. This view is supported by positive psychology, which identifies meaning, purpose and self-transcendence as essential elements of a flourishing life (Seligman, 2011).

The *Mundaka Upanishad* recommends practices such as meditation, self-reflection and disciplined awareness to achieve spiritual balance. Contemporary studies have also shown that these practices improve emotional stability, resilience, concentration and overall well-being (Lomas et al., 2022; Lu et al., 2025).

Therefore, the Upanishadic framework offers a comprehensive and integrated model of multidimensional well-being that can be applied in education, workplaces, counselling and mental health practices. A significant distinction between contemporary wellness models and the Upanishadic perspective lies in their ultimate goals. Modern approaches generally aim at improved functioning and psychological adjustment, whereas the *Mundaka Upanishad* seeks liberation from ignorance and existential suffering. Therefore, spiritual balance in the Upanishadic sense is not simply emotional calmness but a transformative state of self-realisation.

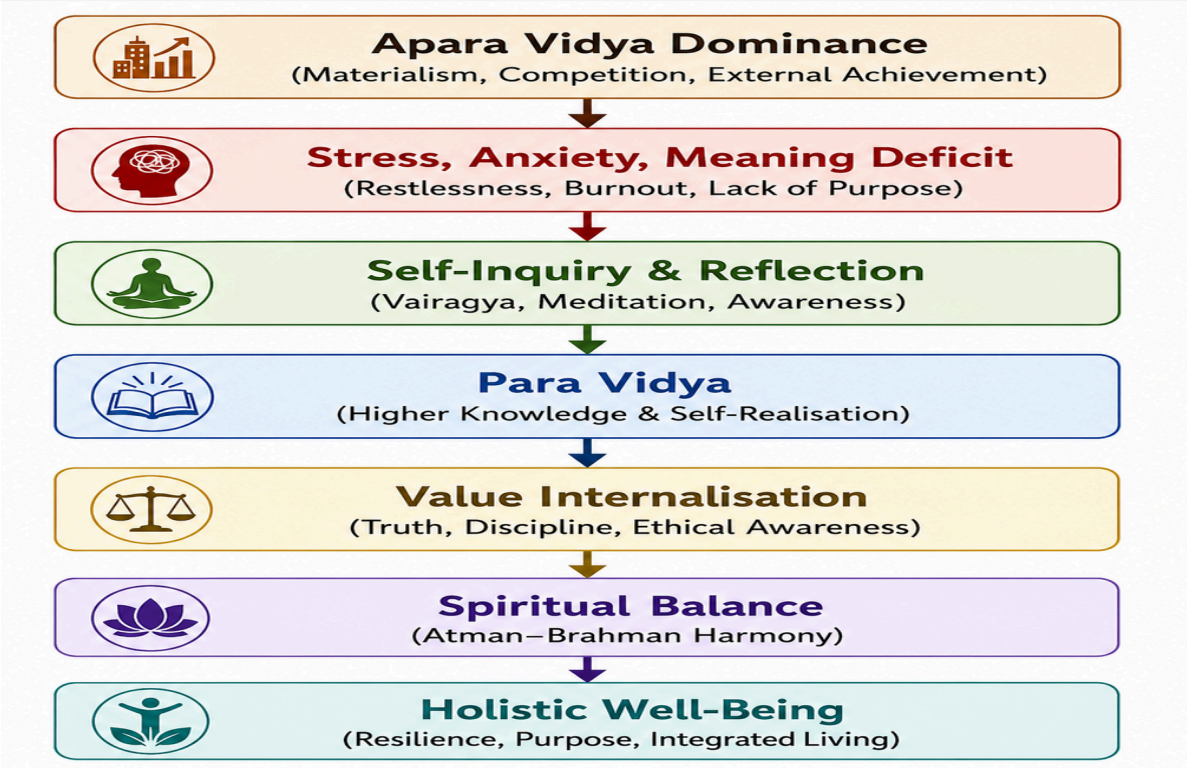

Figure 1: Integrated Conceptual Framework Based on the *Mundaka Upanishad*

4.6 Integrated Conceptual Model

The present study proposes an integrated conceptual model in which spiritual knowledge acts as the foundation of holistic well-being. The model explains human development through a connected and continuous process:

The model is dynamic because balanced living further strengthens reflective consciousness through disciplined practices and introspection. In this way, each stage supports and reinforces the others.

The model combines the philosophical insights of Vedantic thought with modern psychological concepts supported by empirical research. Therefore, it provides a unified framework for understanding personal growth, affective balance, ethical development and spiritual well-being in contemporary life.

4.7 Critical Perspectives and Contemporary Applicability

Although the proposed framework is conceptually strong, it also has certain limitations. Concepts such as *Para Vidya* and *Brahman* are metaphysical in nature, making them difficult to measure through conventional scientific methods. Modern psychology can partly assess these ideas through indicators such as subjective well-being, emotional stability and life satisfaction, but such measures cannot fully explain the depth of spiritual realisation (Diener, 2000; Ryff, 1989).

Another limitation is cultural interpretation. Since Vedantic philosophy originates in the Indian spiritual tradition, people from different cultural backgrounds may understand or accept these concepts differently. However, practices such as mindfulness, self-awareness, meditation and ethical living have universal relevance and can be adapted across cultures when presented in an appropriate context (Kabat-Zinn, 2003).

It is also important to recognise that spiritual approaches should support and not replace evidence-based psychological or medical treatments, especially in cases of severe mental health conditions (American Psychiatric Association, 2013).

Despite these limitations, the integrative framework remains highly valuable because it connects philosophy, psychology, spirituality and well-being studies. Its interdisciplinary nature makes it relevant for education, counselling, organisational development and mental health practices in the modern world.

4.8 Synthesis of Findings

The analysis shows that the *Mundaka Upanishad* provides a philosophically strong and practically meaningful framework for dealing with modern challenges such as stress, decline of values and existential imbalance. Its teachings on higher knowledge, detachment and self-realisation offer a deeper and more lasting alternative to approaches that focus only on material success or symptom management.

The study combines ancient Upanishadic wisdom with contemporary psychological theories to present a holistic model of human well-being that is both theoretically sound and practically useful. This integrated perspective highlights the continuing relevance of Vedantic philosophy in understanding and managing the complexities of modern life.

The proposed framework goes beyond philosophical interpretation and contributes to the development of an interdisciplinary approach that connects spirituality, psychology and ethics. Thus, the *Mundaka Upanishad* emerges not only as a spiritual text but also as a valuable guide for achieving balanced and meaningful living in the contemporary world.

Table 1: Thematic Analysis of the Mundaka Upanishad in Contemporary Context

Theme	Upanishadic Concept	Modern Interpretation	Theoretical / Empirical Support	Impact on Human Life	Practical Application
Knowledge Duality	Para vs Apara Vidya	Intrinsic vs extrinsic knowledge	Deci & Ryan (2000), Seligman (2011)	Reduces dissatisfaction	Holistic education models
Stress Causation	Avidya, Attachment	Cognitive-emotional stress	Kabat-Zinn (2003), Lazar et al. (2005)	Reduces anxiety & burnout	Mindfulness & detachment
Self-Awareness	Atman–Brahman unity	Identity beyond ego	Ryff (1989), Diener (2000)	Emotional stability	Meditation practices
Value Formation	Truth, discipline	Internalised ethics	Goleman (1998)	Ethical consistency	Value-based education

Detachment	Vairagya	Emotional regulation	Lomas et al. (2022)	Stress reduction	Workplace wellness
Spiritual Balance	Brahman realisation	Holistic well-being	Seligman (2011)	Inner harmony	Mental health models
Integrated Living	Unity of knowledge	Balanced life	Interdisciplinary	Life satisfaction	Policy & leadership

5. Conclusion and Implications

5.1 Summary of Key Insights

This study critically examines the relevance of the *Mundaka Upanishad* in addressing major challenges of modern life, such as stress, value decline and lack of inner balance. The analysis highlighted the distinction between *Para Vidya* and *Apara Vidya* and showed that excessive focus on material knowledge without inner awareness leads to psychological imbalance. The findings of the study indicate that the pursuit of higher knowledge rooted in *Vedanta* supports existential harmony and psychological balance. Such mental composure contributes to stress reduction and ethical behaviour. The conceptual model confirms that spiritual knowledge has practical value and can guide individuals toward a balanced and meaningful life. The study establishes that the teachings of the *Mundaka Upanishad* remain highly relevant in contemporary contexts.

5.2 Practical Implications

Education System: The findings highlight the need to integrate value-based and spiritual learning into modern education. Contemporary education systems focus primarily on technical knowledge and overlook inner development. Inclusion of self-awareness, ethical reasoning and reflective practices can support holistic growth. Courses related to philosophy, mindfulness and ethics inspired by the *Mundaka Upanishad* can reduce academic stress and strengthen moral responsibility among students.

Workplace Wellness: Modern workplaces today face rising levels of stress and burnout. The application of ideas from the Upanishads, such as detachment from outcomes, a clear sense of purpose and self-discipline, helps employees feel balanced and focused. Simple practices such as meditation and self-reflection, when included in workplace wellness programs, improve emotional stability, support better decision-making and encourage ethical behaviour. This approach works alongside modern stress management techniques and offers a deeper and more meaningful foundation for overall well-being.

Theoretical Contribution: This study contributes to interdisciplinary research by connecting ancient Indian philosophy with modern psychology and ethics. It presents a structured model that links spiritual knowledge with stress reduction, value development and overall well-being. Unlike conventional approaches that treat these aspects separately, this study offers an integrated framework based on the *Mundaka Upanishad*. It extends Vedantic thought beyond metaphysical discussion and demonstrates its relevance in practical and applied contexts.

5.4 Limitations of The Study

- The study is conceptual and interpretative and does not include empirical testing
- It focuses on a single Upanishad, which may limit general application
- The interpretation of philosophical ideas may vary among scholars
- Cultural context may influence applicability in different settings

5.5 Future Research Directions

- Conduct empirical studies to test the proposed conceptual model using surveys or experimental methods.
- Expand the scope by including other Upanishads and philosophical traditions for comparative analysis.
- Develop measurable scales to assess the impact of spiritual knowledge on stress and ethical behaviour.

The study shows that the *Mundaka Upanishad* provides a timeless and holistic framework for the contemporary world. Its focus on higher knowledge, self-awareness and inner balance offers a meaningful response to present challenges. Integration of this wisdom with contemporary practices can support individuals and institutions in achieving a more balanced, ethical and fulfilling life. This study contributes to the existing literature by developing a conceptual bridge between Vedantic philosophy and contemporary psychological models, thereby offering a holistic framework for understanding stress, values and well-being in modern life. The study demonstrates that ancient Indian philosophical traditions can meaningfully contribute to contemporary interdisciplinary discourse on mental health, ethics and human flourishing.

References

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). American Psychiatric Publishing.

Bartlett, L., Martin, A., Neil, A. L., Memish, K., Otahal, P., Kilpatrick, M., & Sanderson, K. (2021). A systematic review and meta-analysis of workplace mindfulness training randomised controlled trials. *Journal of Occupational Health Psychology, 26*(5), 391–410. https://doi.org/10.1037/ocp0000287

Cornelissen, R. M., Misra, G., & Varma, S. (2014). Foundations of Indian psychology: Theories and concepts. Pearson.

Deci, E. L., & Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behaviour. Psychological Inquiry, 11(4), 227–268.

Diener, E. (2000). Subjective well-being: The science of happiness and a proposal for a national index. American Psychologist, 55(1), 34–43.

Easwaran, E. (2007). *The Upanishads*. Nilgiri Press.

Frankl, V. E. (2006). Man’s search for meaning. Beacon Press.

Goleman, D. (1998). *Working with emotional intelligence*. Bantam.

Gupta, B. (2012). *An introduction to Indian philosophy: Perspectives on reality, knowledge and freedom*. Routledge.

Kabat-Zinn, J. (2003). Mindfulness-based interventions in context: Past, present and future. *Clinical Psychology: Science and Practice, 10*(2), 144–156. https://doi.org/10.1093/clipsy.bpg016

Lazar, S. W., Kerr, C. E., Wasserman, R. H., Gray, J. R., Greve, D. N., Treadway, M. T., & Fischl, B. (2005). Meditation experience is associated with increased cortical thickness. *NeuroReport, 16*(17), 1893–1897. https://doi.org/10.1097/01.wnr.0000186598.66243.19

Lomas, T., Medina, J. C., Ivtzan, I., Rupprecht, S., & Eiroa-Orosa, F. J. (2022). Mindfulness-based interventions in the workplace: An updated systematic review. *Mindfulness, 13*(2), 327–348. https://doi.org/10.1007/s12671-021-01738-2

Lu, G., Li, J., Li, Y., & Chen, C. (2025). The effect of employee mindfulness on thriving at work: A chain mediating effect of self-efficacy and work engagement. *Acta Psychologica*, *259*, 105454.

Pargament, K. I. (2011). Spiritually integrated psychotherapy: Understanding and addressing the sacred. Guilford Press.

Radhakrishnan, S. (1994). *The principal Upanishads*. HarperCollins.

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of psychological well-being. Journal of Personality and Social Psychology, 57(6), 1069–1081.

Seligman, M. E. P. (2011). *Flourish: A visionary new understanding of happiness and well-being*. Free Press.

Shankaracharya. (2006). *The Mundaka Upanishad with commentary* (Swami Gambhirananda, Trans.). Advaita Ashrama.

Sharma, C. (2000). *A critical survey of Indian philosophy*. Motilal Banarsidass.

World Health Organization. (2022). *World mental health report: Transforming mental health for all*. World Health Organization.

TARK TANSAKU
ISSN: (Applied)
Volume 1, Issue 1, March 2026
DOI:

Comparative and Risk-Adjusted Analysis of Selected Mutual Fund Schemes in India with Reference to Nifty 50 Index

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Abstract: *In recent times, mutual funds have become a favoured investment option for many investors, thanks to their ability to offer diversified and expertly managed returns. This study assesses the performance of selected mutual fund schemes in India, comparing their returns to the benchmark Nifty 50 Index over a decade from 2016 to 2025. The research includes fifteen mutual fund schemes across five categories: Small Cap, ELSS Tax Saver, Large & Mid Cap, Hybrid, and Large Cap funds. It relies on secondary data sourced from AMFI and respective Asset Management Companies. A blend of descriptive and quantitative research design is employed. Statistical tools such as mean, ranking, Beta, Sharpe Ratio, Treynor Ratio, Jensen's Alpha, and paired sample t-test are utilized using Microsoft Excel and IBM SPSS Statistics. The findings reveal that while some mutual fund schemes have outperformed the benchmark index, the overall difference is not statistically significant at the 5% level. Analysing performance adjusted for risk yields varied results, with only a handful of funds showing exceptional performance. The study concludes that mutual fund schemes typically align with the benchmark index, indicating that investors should weigh both risk and return when making investment choices.*

Keywords: *Mutual Funds, Nifty 50 Index, Risk-Return Analysis, Performance Evaluation, Statistical Analysis*

1. Introduction

In the 20th century people realized the importance of saving and investing their savings in different investment alternatives that are prevailing in Indian society. Some of the best suitable investment options are real estate, gold, equities, Mutual funds, commodities, and so on. One of the prevailing options is mutual fund schemes. Nowadays the common people in India come to know about the investing in Mutual Funds industry so that they can uplift their capital.

A mutual fund is considered one of the effective investment tools in which people can invest according to their investment objective and can easily fulfil their aim of investment. One can invest in small quantities in mutual funds against their risk-return strategies. It is one of the

fastest-growing segments in the Indian Financial Market. In India, there are 45 Asset Management Companies that provide more than 2500+ Mutual Fund Schemes.

We can conclude that the Indian Mutual fund industry has shown a notable rise in the last few years. Hefty work has been conducted on the performance evaluation of the Mutual Fund Schemes in India. In this chapter, an earnest attempt has been made by the researcher to evaluate the performance of the selected Mutual fund Schemes and to compare the upshots of the evaluation with the performance of the Indian Benchmark Indices.

The selected mutual fund schemes are comprised of equity-based mutual funds. It includes Equity funds, ELSS Tax Saver funds, and Hybrid funds. We will analyze the performance of different equity schemes and after that, we will analyze the performance of Benchmark later on we will compare the performance of the Equity mutual fund schemes with the performance of the Benchmark index for the period of 10 years. Segment is based on research for ten years duration from the year 2016 to the year 2025.

2. Review of literature

Podar and Dmello (2023), examined the perception of investors regarding SIP considering SIP gain and increment in investors income. The research is based on SIP of Axis Bluechip, DSP Equity Fund, ICICI Prudential Fund Kotak Bluechip. The study find out that invest in SIP is safer choice for those investors who want to make long-term investment daily. Most of the investors invest in SIP just for to take tax payemt benefits. The study also suggested that retail investors who did not have active investment can pursue SIP. Mutual fund industries need to create lager investment awareness and should invest advertisement for larger reach to the potential investors.

Jain et al. (2023) made an attempt to analyse the investment decision of investors in respect of mutual fund. In the present study special consideration was given to ensure the accuracy and minimize errors. A limited number of respondents i.e. is 50 were collected through structured questionnaire using convenience sampling method. The study showed that investors who are guts to take risk and seek capital appreciation can make investment in equity and growth schemes. Investors who have regular income can make investment in income plan. The study showed that regular return boosted the confidence of fund investors, leading to increased investments in the market through “MF”. The favourable market conditions have created chance for investors to benefit from capital appreciation and regular income, depending on their risk tolerance and investment goals.

Ananthasuresh et al. (2023), portrait the factors affecting investors investment decisions, preferred investment schemes and investment patterns of investors. The study also analyses the demographic factors in association with investors preference. A descriptive research design base on 148 responses collected through structured questionnaire using convenient sampling method employed in the study. The study indicated that there is a correlation between the demographics of investors as their inclination towards specific mutual fund schemes. The larger part of investors prefers income funds or short-term funds for investment. Form majority of investors location and experience are the least important factors for consideration. Risk and performance are the major factors of consideration during selection of funds.

Maheswari and Reddy (2022), an analysis of market returns and returns of selected schemes in ICICI Mutual Fund, compared the inclination of these selected schemes with those of other "MF" in the economy and explored the reasons which influence investor preference at the time of investing in mutual fund and evaluated the inclination of "MF" using the Sharpe and Treynor models. Upon analyzing both the corporate and nationalized sectors, the study had found that the corporate sector has outperformed the nationalized sector. This is likely due to the implementation of advanced technology, introduction of new schemes, provision of customer benefits, and the availability of online facilities for customers in the corporate sector. Therefore, investors may consider investment in the corporate sector to maximize their returns on investment. While many investment opportunities available, "MF" are a favourable option as they offer optimal returns with relatively low risk. It is a common belief that "low risk - high returns" is the way to go, and "MF" align with this notion.

Klinkowska and Zhao (2022), had provided comprehensive analysis of US SRI mutual fund performance and relation to the flow of new money and experience funds in the context of sophistication of investors. The study compares the SRI retail and institutional share- classes performance and analysed the performance-flow and flow- performance relation of the same above. The study had revealed that SRI mutual fund sectors earn abnormal positive returns and outperforms. There is positive flow performance of SRI mutual fund and linear performance of institutional share- classes. The study failed to revel smart money effect for the SRI retail fund and dumb money effect for institutional funds.

Murthy et. al (2022), made an effort to evaluate the return of chosen equity "MF" using data from different fund schemes in India in terms of return and risk, and evaluated the mutual fund performance of chosen equity "MF" using Sharpe and Treynor. This study is based on 8 Indian equity "MF" from secondary data acquired from the various authentic sources and was based on a detailed analysis of the "MF" from April 2019 - March 2022 using Sharpe, Treynor and ANOVA measures. After examining the various mutual fund schemes, it has been determined that risk and return are the most crucial factors to take into account when choosing an investing strategy, followed by safety and liquidity. Investors should choose funds with a higher Treynor rank if they seek a lower risk investment. Investors should aim for a higher rank in the Sharpe measure if they wish to diversify their holdings and earn a higher rate of return. Investors with a moderate level of knowledge should invest in "MF".

Harinie et al. (2022), made an attempt to analyse the return of mutual fund, present practises of mutual fund and compare mutual fund and equity investment plan using descriptive research design with secondary data which is readily available or which were analysed by others. The present study has found several areas for further study to strengthen the mutual fund performance analysis in India, it is suggested to evaluate the funds' growth, size, and volume, and compare their performance with the of the entire investment market. Moreover, it is very crucial to develop the relation between a fund's specific characteristics and its performance. This relation can provide valuable eyesight into the relationship among different parameters. To attain a better comprehensive understanding of the interdependence among funds and the index, the evaluation of ratio performance and ranking should focus on foreside ratios.

3. Research Objectives

1. To examine the returns generated by selected mutual fund schemes in India from 2016-2025.
2. To compare the performance of selected mutual fund schemes with the returns of the Nifty 50 Index.
3. To evaluate whether the selected mutual fund schemes outperform or underperform the Nifty 50 Index.
4. To evaluate the risk-adjusted performance of selected mutual fund schemes using financial indicators such as Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha.

4. Research Methodology

4.1 Research Design

A combination of quantitative research design and descriptive research design has been employed in the study.

4.2 Sampling Design

4.2.1 Target Population:

Among the active mutual fund schemes in India fifteen different mutual fund schemes have been taken as sample for the research. The mutual fund schemes have been selected from five different categories namely, SMALL CAP FUND schemes, ELSS Tax saver fund schemes, Large & Mid cap fund schemes, Equity Hybrid fund schemes and Large Cap fund Schemes.

4.2.2. Sampling Method:

Five different categories of mutual funds have been selected from different Asset Management Companies using Convenience sampling. Three different types of funds have been selected from each category using the purposive sampling technique.

4.2.3 Sampling Size:

For the research study, a combination of fifteen different mutual fund schemes have been selected that embraces three funds from the small cap category, three funds from Large and Mid-cap category, three funds from ELSS Tax saver category, three funds from Equity Hybrid category and three funds from Large and Mid-cap category.

Selected Mutual Fund Schemes

A total of fifteen mutual fund schemes have been selected for the purpose of the study. All the schemes are under the Direct Plan-Growth option and are categorized into five major segments, namely Small Cap Funds, ELSS (Tax Saver) Funds, Large & Mid Cap Funds, Aggressive Hybrid Funds, and Large Cap Funds. Each category consists of three schemes, representing a diversified selection of funds from different Asset Management Companies.

The schemes selected under the Small Cap category include Kotak Small Cap Fund, Sundaram Small Cap Fund, and SBI Small Cap Fund. Under the ELSS (Tax Saver) category, the selected schemes are Kotak ELSS Tax Saver Fund, HSBC ELSS Tax Saver Fund, and Sundaram ELSS Tax Saver Fund.

Further, the Large & Mid Cap category comprises HDFC Large & Mid Cap Fund, Quant Large & Mid Cap Fund, and Edelweiss Large & Mid Cap Fund. The Aggressive Hybrid category includes SBI Equity Hybrid Fund, HDFC Hybrid Equity Fund, and TATA Hybrid Equity Fund. Lastly, the Large Cap category consists of Edelweiss Large Cap Fund, HSBC Large Cap Fund, and TATA Large Cap Fund.

4.3. Statistical Tools:

The study utilizes statistical tools such as mean, ranking, Beta, Sharpe Ratio, Treynor Ratio, Jensen's Alpha, and paired sample t-test for data analysis. The data has been processed and analyzed using Microsoft Excel and IBM SPSS Statistics.

4.4 Variables Occupied

The study adopts a quantitative research design to examine the relationship between the independent and dependent variables. In this research, one independent variable and one dependent variable have been considered for hypothesis testing.

Table 1: Variable Occupied

Sr. No.	Variable	Type of Variable	Explanation
1.	Year	Independent Variable	It represents the specific duration for which the data has been collected. It is continuous in nature and a numeric value ranging from the year 2016 to the year 2025.
2.	Returns offered by selected Mutual Fund Schemes.	Dependent Variable	Returns data has been collected from the different database provided by the AMC's and AMFI. It is measured in numbers that are collected on annual basis to examine the trends over a decade.

4.5 Research Hypothesis

The following are the hypotheses which are to be tested in the study:

H_0: There is no positive trend in the returns of the selected Mutual Fund Schemes.

H_1: There is a positive trend in the returns of the selected Mutual Fund Schemes.

H_o: There is no statistically significant difference between the average returns of the selected mutual fund schemes and the Nifty50 Index.

H_1: There is a statistically significant difference between the average returns of the selected mutual fund schemes and the Nifty50 Index.

5. Data Analysis

5.1 Average Annual Returns of Selected Mutual Fund Schemes with Nifty50 Benchmark

Table 2: Average Annual Returns of Selected Mutual Fund Schemes with Nifty50 Benchmark

	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	Average	Rank
NIFTY50	**-3.56**	**0.14**	**-.47**	**2.97**	**-.13**	**0.93**	**7.81**	**2.18**	**-3.48**	**7.94**	**1.433**	
Kotak SMALL CAP FUND	0.79	0.18	3.86	0.28	2.02	1.95	2.11	2.60	1.17	0.71	1.567	**3**
Sundaram SMALL CAP FUND	2.34	0.38	3.71	-0.43	1.47	1.17	2.99	3.33	1.22	1.05	1.723	**1**
SBI SMALL CAP FUND	2.17	0.85	2.98	0.09	1.91	0.56	2.46	3.11	1.62	1.20	1.695	**2**
Kotak ELSS Tax Saver Fund	0.14	0.90	3.82	0.28	1.84	-0.15	-0.04	0.86	0.32	0.75	0.872	**4**
HSBC ELSS Tax Saver Fund	0.54	0.97	3.43	0.27	1.31	-0.39	0.18	1.23	-0.06	0.31	0.779	**6**
Sundaram ELSS Tax Saver fund	0.56	0.91	3.83	0.15	1.64	-0.44	0.05	0.98	-0.29	0.49	0.788	**5**
HDFC Large & Mid Cap Fund	0.68	-0.23	1.70	-0.06	0.07	-0.22	0.39	0.76	0.32	0.89	0.43	**9**
Quant Large & Mid Cap Fund	0.45	0.82	1.53	0.17	1.65	-0.33	-0.02	0.51	0.89	1.77	0.744	**7**
Edelweiss Large & Mid Cap Fund	0.27	1.32	0.55	0.54	0.17	-0.44	0.80	0.91	0.13	0.57	0.482	**8**
SBI Equity Hybrid Fund	0.16	0.37	0.40	0.15	0.33	-0.25	0.03	0.78	-0.20	0.42	0.219	**11**
HDFC Hybrid Equity Fund	0.33	0.64	0.10	0.23	0.21	-0.41	0.29	0.55	-0.43	0.23	0.174	**15**
TATA Hybrid Equity Fund	0.56	0.68	0.42	0.23	-.03	-0.47	-0.12	0.75	-0.30	0.45	0.217	**12**
Edelweiss Large Cap Fund	0.73	0.36	0.91	0.53	0.20	-0.50	0.15	0.85	-0.45	0.11	0.289	**10**
HSBC Large Cap Fund	0.44	0.51	0.99	0.28	0.05	-0.69	0.06	0.96	-0.47	-0.29	0.184	**14**
TATA Large Cap Fund	0.33	0.51	0.90	0.47	-.04	-0.59	0.01	0.80	-0.50	0.09	0.198	**13**

Interpretation

The above table shows the annual returns of the selected mutual fund schemes, indicating that most of the funds performed well during the study period.

In 2014, all the mutual fund schemes recorded positive returns, while the benchmark Nifty50 index experienced a loss of 3.56%. The highest return of the year was 2.34%, provided by the Sundaram SMALL CAP FUND.

In 2015, all selected mutual funds showed positive returns except the HDFC Large & Midcap Fund. The SBI Equity Hybrid Fund was the top performer, delivering a return of 1.32%.

In 2016, the Nifty50 index recorded a negative return of 0.47%, whereas all selected mutual funds offered positive returns. The Kotak SMALL CAP FUND delivered the highest return at 3.86%, and the HDFC Hybrid Equity Fund provided the lowest return of 0%.

In 2017, the Nifty50 index returned 2.97%. Two out of the 15 mutual fund schemes recorded negative returns, while the remaining funds performed positively. The Edelweiss Large Cap Fund provided the highest return of 0.54%, whereas the Sundaram SMALL CAP FUND recorded the highest negative return of -0.43%.

In 2018, the Nifty50 index showed a slight negative return of 0.13%. Two funds recorded negative returns, while the other 13 performed well. The Kotak SMALL CAP FUND achieved the highest return of 2.02%, and the TATA Large Cap Fund delivered negative returns.

In 2019, the Nifty50 index returned 0.93%. The Kotak SMALL CAP FUND was the top performer with a return of 1.95%, while the HSBC Large Cap Fund was the lowest performer, posting a negative return of -0.69%.

In 2020, the Nifty50 index offered a return of 7.81%. The Sundaram SMALL CAP FUND delivered the highest return of 2.99%, whereas the TATA Hybrid Equity Fund recorded the lowest return of -0.12%.

In 2021, the Nifty50 index returned 2.81%. The Sundaram SMALL CAP FUND was the highest performer, providing 3.33%, while the Quant Large & Mid Cap Fund offered the lowest return of 0.51%.

In 2022, the Nifty50 index fell by -3.48%. The SBI SMALL CAP FUND recorded the highest return at 1.62%, and the TATA Large Cap Fund had the lowest return of 0.50%.

In 2023, the Nifty50 index delivered a return of 7.94%. The Quant Large & Mid Cap Fund provided the highest return of 1.77%, while the HSBC Large Cap Fund recorded the lowest return of -0.29%.

5.2 Beta, Sharpe ratio, Treynor ratio, Jensen Alpha (November 2025)

Table 3: Consolidated Beta, Sharpe ratio, Treynor ratio, Jensen Alpha

Name of Scheme	Beta	Sharpe Ratio	Treynor's Ratio	Jensen's Alpha
Kotak SMALL CAP FUND	0.71	0.79	0.15	-1.48
Sundaram SMALL CAP FUND	0.76	0.99	0.19	1.24

SBI SMALL CAP FUND	0.69	0.72	0.13	-1.87
Kotak ELSS Tax Saver Fund	0.96	0.74	0.10	-0.55
HSBC ELSS Tax Saver Fund	1.10	0.89	0.12	1.75
Sundaram ELSS Tax Saver Fund	0.87	0.75	0.10	-0.35
HDFC Large & Mid Cap Fund	0.98	1.05	0.14	1.62
Quant Large & Mid Cap Fund	1.04	0.69	0.10	-2.44
Edelweiss Large & Mid Cap Fund	0.98	0.83	0.11	-1.13
SBI Equity Hybrid Fund	0.96	0.93	0.08	1.20
HDFC Hybrid Equity Fund	1.70	0.77	0.04	-1.45
TATA Hybrid Equity Fund	1.08	0.63	0.05	-1.63
Edelweiss Large Cap Fund	0.92	0.78	0.10	1.37
HSBC Large Cap Fund	0.99	0.66	0.08	0.06
TATA Large Cap Fund	0.97	0.77	0.09	0.83

Interpretation

The beta value exhibits that among the selected 15 funds majority of funds are highly volatile except Kotak SMALL CAP FUND. Sundaram SMALL CAP FUND, SBI SMALL CAP FUND, Sundaram ELSS Tax saver fund, SBI Equity Hybrid fund, TATA Hybrid Equity Fund and Edelweiss Large Cap Fund.

The Sharpe ratio of the selected mutual fund schemes indicates that among the selected 15 funds all the majority of funds are poorly risk adjusted except Sundaram SMALL CAP FUND, HSBC ELSS Tax Saver fund, HDFC Large & Mid Cap, SBI Equity Hybrid fund and Edelweiss Large cap fund.

According to the Treynor's ratio majority of the selected funds are poor risk adjusted except Sundaram SMALL CAP FUND, HSBC ELSS Tax saver fund, HDFC Large & Mid cap fund, SBI Equity Hybrid Fund and Edelweiss Large Cap fund.

According to the Jensen's Alpha, only few funds are better risk adjusted except Kotak SMALL CAP FUND, SBI SMALL CAP FUND, Kotak ELSS Tax saver fund, Sundaram ELSS Tax saver fund, Quant ELSS Tax saver fund, Edelweiss Large & Mid cap fund, HDFC Equity Hybrid fund, TATA Equity Hybrid fund, HSBC Large & Mid cap fund.

5.3 Performance of Selected Mutual Funds Compared to Nifty 50

Table 4: Consolidated Performance of Selected Mutual Funds Compared to Nifty 50

Mutual Fund / Index	2020	2021	2022	2023	2024	Average
Nifty 50	7.18	2.18	-3.48	7.94	1.50	3.06
Kotak Small Cap Fund	2.11	2.60	1.17	0.71	-0.46	1.23
Sundaram Small Cap Fund	2.99	3.33	1.22	1.05	0.02	1.46
SBI Small Cap Fund	2.46	3.11	1.62	1.20	0.12	1.70
Kotak ELSS Tax Saver Fund	-0.04	0.86	0.32	0.75	0.08	1.91
HSBC ELSS Tax Saver Fund	0.18	1.23	-0.06	0.31	0.03	1.35
Sundaram ELSS Tax Saver Fund	0.05	0.98	-0.29	0.49	-0.19	0.21
HDFC Large & Mid Cap Fund	0.39	0.76	0.32	0.89	-0.12	0.45
Quant Large & Mid Cap Fund	-0.02	0.51	0.89	1.77	0.82	0.79
Edelweiss Large & Mid Cap Fund	0.80	0.91	0.13	0.57	0.07	0.49

SBI Equity Hybrid Fund	0.03	0.78	-0.20	0.42	-0.42	0.12
HDFC Hybrid Equity Fund	0.29	0.55	-0.43	0.23	-0.18	0.09
TATA Hybrid Equity Fund	-0.12	0.75	-0.30	0.45	-0.10	0.14
Edelweiss Large Cap Fund	0.15	0.85	-0.45	0.11	0.15	0.18
HSBC Large Cap Fund	0.06	0.96	-0.47	-0.29	-0.15	0.22
TATA Large Cap Fund	0.01	0.80	-0.50	0.09	0.09	0.98

Interpretation

Table depicts the returns of selected mutual fund schemes which indicates that the majority of funds had performed well during the period of study.

In the year 2020, the Benchmark Index Nifty50 offered 7.81% returns. The highest returns were provided by Sundaram SMALL CAP FUND offering a return of 2.99% while the lowest performer was the TATA Hybrid Equity Fund which offered a negative return of 0.12%.

In the year 2021, the Benchmark index of Nifty50 offered a return of 2.81%. the performer of the period was Sundaram SMALL CAP FUND offering 3.33% and the lowest returns were provided by Quant Large & Mid Cap Fund offering 0.51%.

In the year 2022, the Benchmark Index of Nifty50 offered a return of -3.48%. The highest returns were provided at 1.62% by the SBI SMALL CAP FUND. The lowest returns were provided by the TATA Large Cap Fund of 0.50%.

In 2023, the Benchmark Index of Nifty50 offered a return of 7.94%. Quant Large & Mid Cap Fund provided the highest returns of 1.77%. The HSBC Large Cap Fund provided the lowest returns of -0.29%.

In the year 2024, the Benchmark Index Nifty50 offered 1.5% returns. Quant Large & Mid Cap Fund provided the highest returns of 1.77% while the lowest performer was Kotak SMALL CAP FUND which offered a negative return of 0.46%.

5.4 Paired Sample t-Test

Table 5: Consolidated Results of Paired Sample t-Test

Sr. No.	Mutual Fund Scheme	Mean Difference	t-value	p-value	Result (5% level)	Interpretation
1	Kotak Small Cap Fund	1.838	0.883	0.427	Not Significant	No difference
2	Sundaram Small Cap Fund	1.342	0.664	0.543	Not Significant	No difference
3	SBI Small Cap Fund	1.362	0.652	0.550	Not Significant	No difference
4	Kotak ELSS Tax Saver Fund	2.670	1.285	0.268	Not Significant	No difference
5	HSBC ELSS Tax Saver Fund	2.726	1.324	0.256	Not Significant	No difference
6	Sundaram ELSS Tax Saver Fund	2.586	1.428	0.227	Not Significant	No difference

7	HDFC Large & Mid Cap Fund	2.608	1.238	0.283	Not Significant	No difference
8	Quant Large & Mid Cap Fund	2.270	1.092	0.336	Not Significant	No difference
9	Edelweiss Large & Mid Cap Fund	2.568	1.294	0.265	Not Significant	No difference
10	SBI Equity Hybrid Fund	2.942	1.464	0.217	Not Significant	No difference
11	HDFC Hybrid Equity Fund	2.972	1.509	0.206	Not Significant	No difference
12	TATA Hybrid Equity Fund	2.928	1.453	0.220	Not Significant	No difference
13	HSBC Large Cap Fund	3.042	1.472	0.215	Not Significant	No difference
14	TATA Large Cap Fund	2.966	1.466	0.216	Not Significant	No difference

Interpretation

The paired sample t-test was utilized to determine if there is a notable difference between the returns of certain mutual fund schemes and the Nifty 50 Index. The findings indicate that for all 14 mutual fund schemes, the p-values exceed 0.05, suggesting that the results are not statistically significant at the 5% significance level.

This suggests that there is insufficient statistical evidence to reject the null hypothesis. In other words, the returns from the selected mutual fund schemes do not significantly differ from those of the Nifty 50 Index.

Even though some mutual funds exhibit higher average returns compared to the index, these variations are not substantial enough to be deemed statistically significant. Consequently, it can be inferred that the performance of the chosen mutual fund schemes is similar to the benchmark index, rather than consistently outperforming or underperforming it.

6. Conclusion

The research examined the performance of various mutual fund schemes across different categories over a decade. It found that most of these schemes generated positive returns during this period, though their performance differed by year and category.

Small-cap funds stood out with relatively higher average returns, whereas hybrid and large-cap funds offered more consistent but lower returns. The Nifty 50 Index also showed fluctuations, indicating market volatility throughout the study.

The risk-return assessment, utilizing Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha, revealed that only a few mutual fund schemes excelled on a risk-adjusted basis, while the majority exhibited average or below-average performance.

The results of the paired sample t-test indicated that there is no statistically significant difference between the returns of the chosen mutual fund schemes and the Nifty 50 Index. Consequently, the null hypothesis is upheld, suggesting that, on average, mutual funds neither significantly outperform nor underperform the benchmark index.

In summary, mutual funds continue to be a viable investment choice for investors; however, investment decisions should be made with caution, taking into account risk, return, and investment goals rather than relying solely on historical performance.

References

Agarwal, K., Joshi, P. L., & Shahnawaz, K. (2018) Comparative Analysis Of Nifty Index Exchange Traded Funds With Underlying Assets.

Babbar, S., & Sehgal, S. (2018). Mutual fund characteristics and investment performance in India. *Management and Labour Studies*, *43*(1-2), 1-30.

Chawla, M., & Gorowara, N. (2021). Interlinkages Between The Mutual Fund Performance And The Benchmark Market Returns (Nifty Fifty And Sensex Index Returns). *International Journal of Management (IJM)*, *12*(1).

Daita, N. (2020) "A Study on Performance Evaluation of Select Large Cap Mutual Fund Growth Schemes in India," SSRG International Journal of Economics and Management Studies, vol. 7, no. 6, pp. 54-64, 2020. Crossref, https://doi.org/10.14445/23939125/IJEMS-V7I6P109

Devarakonda, S. (2022) Performance Measurement of Selected Equity Index Mutual Funds. *International Journal of Advanced Research in Management.* 13(1). ISSN no: 0976-6332

Dhume, P. Patil, A. (2019). Performance Evaluation of Exchange Traded Funds in India. *SSRG International Journal of Economics Management Studies*. 6(3).

Fan, L. (2025) Assessing the Performance of Actively Managed Global Funds.

Helwade, R., Mangalagouri, & Deshpande, B. (2023) A Study Exchange Traditional Fund (ETF) As an Investment Avenue For Passive Wealth Growth In India with Reference To Nifty50. *The Online Journal of Distance Education and e-Learning*, *11*(1).

Kurian, B. C. (2020). Performance of nifty 50 ETFs in India. *Indian Accounting Review*, *70*, 25.

Magdum, A., & Samant, C. G. A. (2019). A Comparative Study on Mutual Fund Schemes of Selected AMCs in India. *Management*.

Maheshwari, Y., & Reddy, P. R. A Comparative Study on Performance of Equity, Debt And Hybrid Mutual Fund Schemes in India.

Maheswari, Y. (2020). A Comparative Study on Performance of Selected Mutual Funds in India. *Available at SSRN 3615774*.

Murthy, J., Anjaneyulu, M. S. R., Bhatt, M. H., & Kumar, M. D. S. (2022). Performance Evaluation Of Mutual Funds: A Study On Selected Equity Mutual Funds In India. *Journal of Positive School Psychology*, *6*(9), 1124-1132.

Ramya, K., & Bhuvaneshwari, D. (2021). Dynamic Interaction Between Nifty 50 and Nifty Sectoral Indices: An Empirical Study on Indian Stock Indices. *NMIMS Management Review*, *24*(2).

Raut, M. T. V., & Kariya, N. S. (2025) Study Of Fund Performance Analysis Of Selected Equity Hybrid Mutual Funds In India.

Raval, N., & Mehta, R. (2020). A comparative study between nifty50 with financial services & pharmaceutical sector. *International Journal for Innovative Research in Multidisciplinary Field*, *6*(5), 286-291.

Sachin, K. S., & Goud, G. V. (2018). A Study on Performance Analysis of Nifty Fifty Selected SBI Mutual Funds Exchange Traded Funds and Bank Deposits Bangalore.

Samanta, T. K. (2019). A Study on the Performance of Mutual Fund Scheme in India. *International Journal of Advanced Engineering, Management and Science*, *5*(6), 403-408.

Sharma, I., Bharti, B. V., & Saini, C. Performance Evaluation of Selected Open-Ended Mutual Fund Schemes in India.

Sharma, K., & Joshi, P. (2021). A Comparative Study On Performance Evaluation Of Selected Debt, Equity, And Hybrid Mutual Fund Schemes In India. *Gap Gyan-A Global Journal Of Social Sciences*, *4*(2), 34-40.

Singh, K., & Kumar, V. (2020). The dynamic linkage between nifty-fifty and sectorial indices of the national stock exchange. *American Journal of Economics and Business Management*, *3*(2), 17-27.

Tripathi, S., & Japee, D. G. P. (2020). Performance evaluation of selected equity mutual funds in India. *Gap Gyan-A Global Journal of Social Sciences*.

Vora, K. (2018). Influence of Financial Performance Indicators on Market Price of Shares of Nifty 50 Companies. *International Journal of Advance Research in Computer Science and Management Studies*.

TARK TANSAKU
ISSN: (Applied)
Volume 1, Issue 1, March 2026
DOI:

Sanatan Principles of Financial Management: The SHIVA Model

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Abstract: Modern financial management predominantly emphasizes profit maximization, shareholder wealth, and efficiency optimization; however, repeated financial crises, governance failures, earnings manipulation, and environmental degradation have exposed serious ethical and sustainability limitations within conventional finance theory. This study proposes a culturally grounded framework titled the SHIVA Model of Finance, derived from Sanatan philosophical principles and interpretative insights from Shaiva thought, to reconceptualize financial management as a morally embedded discipline. The model integrates wealth acquisition (Arjana) and wealth utilisation (Vyaya) through five interrelated pillars Sustainability, Honesty in acquisition, Intent-based allocation, Value for society, and Accountability thereby offering an ethical-financial governance architecture aligned with long-term societal well-being. By bridging Indian Knowledge Systems (IKS) with contemporary corporate finance, the study contributes a structured conceptual model that is both philosophically rooted and empirically measurable through governance and performance indicators.

Keywords: Sanatan Finance, SHIVA Model, Dharma, Corporate Governance, Ethical Financial Management.

1. Introduction

Financial management has traditionally been defined as the efficient acquisition, allocation, and utilization of financial resources to maximize organizational value. Classical finance theory, rooted in neoclassical economics, prioritizes profit maximization, shareholder wealth enhancement, capital structure optimization, and risk-return equilibrium. While these principles have contributed significantly to economic growth and corporate expansion, the global financial landscape has repeatedly experienced ethical failures, speculative excesses, environmental degradation, and governance breakdowns. These recurring crises have intensified scholarly calls for a deeper moral and philosophical foundation in financial decision-making. In recent decades, the increasing integration of Environmental, Social, and Governance (ESG) metrics, stakeholder

theory, and corporate social responsibility (CSR) frameworks has attempted to address these concerns. However, much of this reform remains compliance-driven and regulatory in nature, often responding reactively to crises rather than proactively embedding ethical consciousness within financial systems. The dominant paradigm still largely treats finance as a technical discipline governed by quantitative models, mathematical optimization, and instrumental rationality, with limited engagement with normative or civilizational perspectives. Against this backdrop, there is a growing intellectual movement advocating the incorporation of indigenous knowledge systems into contemporary management and finance scholarship. Indian Knowledge Systems (IKS), particularly those derived from Sanatan philosophy, provide a holistic worldview that integrates ethics, duty, sustainability, and long-term societal welfare into economic conduct. In Sanatan thought, wealth (Artha) is recognized as one of the four Purusharthas Dharma (righteousness), Artha (wealth), Kama (desire), and Moksha (liberation). However, Artha is never autonomous; it is inherently regulated by Dharma. Wealth creation is legitimate and necessary, but it must operate within moral boundaries and serve collective well-being.

Sanatan philosophy does not reject economic activity; rather, it contextualizes it within a broader cosmic and ethical order. The principles of Dharma (righteous conduct), Karma (moral causation), Rta (cosmic balance), and Lokasangraha (welfare of society) collectively establish a normative framework for responsible wealth management. Financial acquisition and utilization are not merely economic transactions but ethical acts with long-term consequences. This worldview introduces a multidimensional understanding of finance one that extends beyond numerical profitability to include intention, responsibility, and sustainability. The relevance of such a perspective is particularly significant in emerging economies like India, where rapid financialization and globalization intersect with deeply rooted cultural and philosophical traditions. Corporate governance reforms, sustainability reporting mandates, and increasing regulatory oversight reflect the need for ethical stabilization within capital markets. Yet, the conceptual foundation of financial management curricula and corporate strategy continues to draw predominantly from Western theoretical constructs. Integrating Sanatan principles into financial thought offers not only cultural relevance but also a potentially transformative governance lens.

From a theoretical standpoint, this study argues that financial management must be reconceptualized as a morally embedded discipline. Wealth acquisition should align with righteous conduct, and wealth utilization should promote long-term balance and societal upliftment. The ethical dimension must move from peripheral compliance to central philosophy. Such a reconceptualization requires developing a structured framework that synthesizes sustainability, integrity, purposeful allocation, social value creation, and institutional responsibility within a unified financial governance model.

This article therefore seeks to explore and articulate Sanatan principles of financial management, drawing interpretative insights from classical philosophical sources and aligning them with contemporary governance discourse. By bridging indigenous ethical thought and modern corporate finance, the study aims to contribute to the expanding field of culturally grounded management theory. The proposed framework aspires to provide a holistic approach to financial decision-making, one that harmonizes economic efficiency with moral accountability and long-term societal well-being. In doing so, the paper responds to the broader scholarly call for alternative paradigms in finance that transcend narrow profit-centric models and instead situate wealth within a balanced, responsible, and ethically conscious order.

2. Review of Literature

Financial management as an academic discipline has historically evolved from classical economic thought, emphasizing rational decision-making, efficiency, and wealth maximization. The dominant paradigm in corporate finance prioritizes shareholder value as the primary objective of the firm (Jensen & Meckling, 1976). Agency theory explains managerial behaviour through contractual relationships between principals and agents, assuming rational self-interest and focusing on minimizing agency costs. While this framework has significantly shaped corporate governance mechanisms, critics argue that exclusive reliance on shareholder primacy has encouraged short-termism, speculative behavior, and underinvestment in long-term societal goals (Stout, 2012). Empirical evidence suggests that pressure to meet short-term financial targets can incentivize earnings manipulation and reduce commitment to sustainable strategies (Barton & Wiseman, 2014).

In response to these limitations, stakeholder theory broadened the objective of the firm to include multiple interest groups beyond shareholders (Freeman, 1984). This perspective emphasizes that long-term value creation depends on balancing the interests of employees, customers, suppliers, communities, and investors. The evolution of Environmental, Social, and Governance (ESG) frameworks further reflects the institutionalization of sustainability and ethical responsibility within financial systems. (Eccles and Klimenko,2019) note that investors increasingly incorporate ESG indicators into decision-making processes, recognizing their relevance to risk management and long-term performance. However, critics observe that ESG adoption often remains compliance-driven, shaped by regulatory pressures and reputational considerations rather than deeply embedded ethical commitments (Cho et al., 2015). The ethical dimension of finance has gained prominence in scholarly debates questioning whether financial systems can remain value-neutral. (Boatright, 2013) argues that financial decisions inherently affect human welfare and therefore require moral evaluation. (Sandel, 2012) similarly critiques the expansion of market logic into areas traditionally governed by ethical norms, highlighting the need to reconsider the moral limits of markets. Corporate governance research further demonstrates that ethical culture within organizations significantly influences reporting quality, fraud prevention, and long-term credibility (Trevino & Nelson, 2017). Studies have shown that strong internal controls and governance structures are associated with reduced financial misstatements and enhanced transparency (Dechow et al., 2010; Beasley, 1996). Nonetheless, governance mechanisms often function as external monitoring systems, focusing on deterrence rather than cultivating intrinsic ethical orientation.

Sustainable finance has emerged as a critical research domain addressing environmental and social risks alongside financial returns. (Bansal and DesJardine, 2014) emphasize the importance of long-term orientation in achieving organizational resilience, arguing that sustainability requires temporal balance between present performance and future stability. (Nasution and Sibuea, 2024) provide empirical evidence linking effective financial management practices with improved sustainability outcomes in emerging markets. Integrated reporting frameworks attempt to connect financial performance with social and environmental indicators, thereby enhancing transparency and stakeholder engagement (Adams, 2015). Yet, sustainability initiatives sometimes risk becoming symbolic or superficial, lacking substantive integration into capital allocation decisions (Cho et al., 2015). Parallel to these developments, indigenous philosophical traditions offer alternative perspectives on wealth and economic conduct. Indian philosophical thought conceptualizes wealth (Artha) as one of the four Purusharthas, inherently regulated by

Dharma or righteous conduct (Radhakrishnan, 1923). Unlike purely materialistic paradigms, this framework positions economic pursuit within a moral and cosmic order. Concepts such as Karma (moral causation) and Rta (cosmic balance) imply that economic actions carry long-term ethical consequences beyond immediate financial outcomes (Sharma, 2000). This perspective contrasts with the rational self-interest assumption of agency theory by emphasizing duty-consciousness and accountability. Contemporary scholarship on Indian Knowledge Systems advocates the integration of indigenous ethical frameworks into modern management education and governance research (Sinha, 2010). Such integration is particularly relevant in culturally diverse and rapidly developing economies where financial modernization intersects with longstanding philosophical traditions. The absence of a unified ethical framework that systematically connects sustainability, integrity, responsible allocation, social welfare, and accountability highlights a gap in existing financial management literature. Although stakeholder theory and ESG initiatives partially address these concerns, they often lack a coherent philosophical foundation that integrates acquisition and utilization of wealth within a balanced moral system.

The literature indicates a growing recognition of the ethical and sustainability limitations of conventional financial models. While substantial progress has been made in integrating governance reforms and sustainability metrics, the normative grounding of financial management remains fragmented. This gap underscores the need for a culturally rooted and philosophically coherent framework capable of synthesizing economic efficiency with moral responsibility and long-term societal well-being.

3. Methodology

This study adopts a theoretical and conceptual research design grounded in qualitative interpretative analysis to develop an ethically oriented framework for financial management based on Sanatan philosophical principles and Shaiva thought. The paper relies entirely on secondary sources, including classical Indian philosophical literature, Indian Knowledge Systems (IKS), corporate governance studies, sustainable finance literature, stakeholder theory, and contemporary financial management research. Key concepts such as Dharma, Artha, Karma, Rta, and Lokasangraha were interpretatively examined to understand their relevance in modern financial governance, wealth acquisition (Arjana), and wealth utilisation (Vyaya). Through thematic conceptualization, comparative philosophical analysis, and interdisciplinary synthesis, the study systematically integrates ethical-financial dimensions into a structured governance framework titled the SHIVA Model of Finance, comprising Sustainability, Honesty in Acquisition, Intent-Based Allocation, Value for Society, and Accountability. The framework is further aligned with measurable governance and financial indicators to enhance future empirical applicability. Additionally, AI-assisted academic tools such as ChatGPT

4. Principles of Wealth Acquisition (Arjana)

The first core dimension of Sanatan financial thought concerns the manner in which wealth is generated. Acquisition is not evaluated merely by outcome but by means. Dharma-based acquisition emphasizes that wealth must be earned through righteous conduct. In Shaiva narratives, adharmic accumulation leads to destruction, symbolizing the instability of unethical gain. Wealth earned through tapas (disciplined effort) is portrayed as sustainable and spiritually aligned. Translating this into modern corporate finance, the principle discourages fraud, earnings manipulation, exploitative pricing, and regulatory evasion. Instead, it promotes

compliance-driven growth, transparency, and integrity in reporting. Ethical acquisition builds reputational capital and long-term stability. Closely linked to this is the Purushartha framework, which positions Artha under the moral supervision of Dharma. Wealth is a legitimate human pursuit, yet it cannot override ethical boundaries. In corporate interpretation, profit maximization must operate within regulatory, social, and environmental limits. The idea challenges unrestrained shareholder primacy and encourages financial strategies aligned with moral responsibility.

Another foundational element is the emphasis on tapasya disciplined and sustained effort as a form of capital. In Shaiva symbolism, devotion and perseverance generate transformative outcomes. Financially, this translates into prioritizing human capital development, innovation, and long-term strategic investments over speculative gains. Sustainable growth emerges from competence, knowledge, and disciplined execution rather than aggressive leverage or short-term speculation.

Equally significant is detachment from greed. Shiva's ascetic imagery conveys simplicity despite cosmic authority. Financially, this principle discourages over-leveraging, reckless expansion, and excessive risk-taking. Detachment does not imply inactivity; rather, it encourages prudent risk management and balanced capital structuring. By restraining greed-driven expansion, firms preserve resilience and long-term survival.

5. Principles of Wealth Utilisation (Vyaya)

Sanatan philosophy extends ethical responsibility beyond acquisition to the deployment of wealth. Wealth utilisation is guided by Lok Kalyan—the welfare of society. Resources must contribute to collective upliftment rather than serve narrow private interests. In modern financial systems, this aligns with corporate social responsibility, ESG investments, and community development initiatives. However, within Sanatan thought, social contribution is not peripheral philanthropy but an intrinsic duty attached to wealth ownership.

Balance is another central principle, symbolized by the form of Ardhanarishvara, representing harmony and complementarity. Financially, this implies balanced allocation among stakeholders—shareholders, employees, customers, society, and the environment. Stakeholder-oriented capital deployment fosters sustainable value creation and reduces conflict between profit and purpose. The destruction of toxic wealth is another profound metaphor derived from Shaiva narratives, particularly the episode of consuming poison during cosmic imbalance. In financial interpretation, this suggests that unethical revenue streams, non-performing assets, or harmful business models must be eliminated even at short-term cost. Cleansing the balance sheet of toxic accumulation preserves long-term stability and moral legitimacy.

Minimalism and capital efficiency further define wealth utilisation. Shiva's austere lifestyle symbolizes restraint. Financially, this principle advocates controlling unnecessary expenditures, avoiding vanity investments, and maintaining liquidity discipline. Efficient utilisation of resources strengthens operational resilience and enhances strategic flexibility.

6. The SHIVA Model

The SHIVA Model of Finance presents a culturally rooted and ethically grounded framework for financial management derived from Sanatan philosophical principles. Unlike conventional finance models that primarily emphasize profit maximization and shareholder wealth (Jensen & Meckling, 1976), this framework integrates wealth acquisition (Arjana) and wealth utilisation (Vyaya) within a moral-economic structure. It addresses the ethical and sustainability gaps in traditional finance, which often prioritize short-term financial gains at the expense of long-term societal well-being (Stout, 2012). The model is structured around five interrelated pillars—Sustainability, Honesty in acquisition, Intent-based allocation, Value for society, and Accountability—each of which strengthens financial governance while remaining empirically measurable.

Sustainability (S) emphasizes long-term equilibrium, environmental stewardship, and financial resilience. Rather than focusing on immediate profitability, it prioritizes steady growth, optimal leverage, and intergenerational equity. This aligns with empirical findings suggesting that effective financial management contributes positively to long-term organizational sustainability (Nasution & Sibuea, 2024). Sustainable financial practices enhance risk management capacity and organizational stability, reinforcing the idea that long-term value creation must supersede short-term speculation.

Honesty in Acquisition (H) reinforces ethical wealth generation through transparent reporting, lawful operations, and compliance integrity. Corporate fraud and earnings manipulation often stem from short-term performance pressures (Morin, 2024). By embedding honesty within acquisition strategies, firms reduce litigation risk, enhance investor trust, and mitigate short-termism. This pillar extends governance mechanisms beyond regulatory enforcement by promoting intrinsic ethical responsibility in financial decision-making.

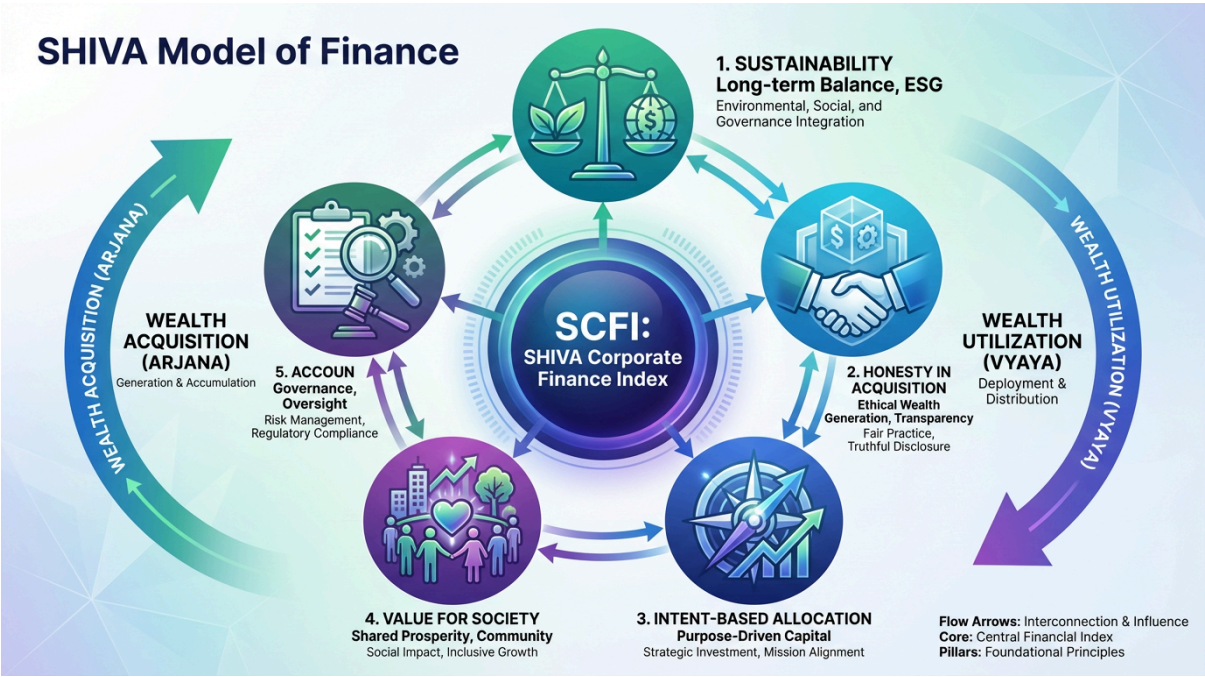

Figure 1: The SHIVA Model of Finance

Intent-Based Allocation (I) introduces moral purpose into capital deployment. Traditional financial models rely heavily on quantitative tools such as NPV and IRR; however, there is growing recognition that financial decisions require philosophical and ethical consideration beyond mechanical computation (Fung et al., 2010). Intent-based allocation encourages firms to evaluate the broader social, environmental, and strategic consequences of investments. It prioritizes human capital development, innovation, and sustainable business models over purely speculative returns.

Value for Society (V) ensures that financial resources generate inclusive and shared prosperity. Corporate finance should not function solely as a shareholder enrichment mechanism but as a tool for broader societal upliftment. Research indicates that integrating ethical considerations into financial strategy positively influences corporate performance and stakeholder relationships (Munteanu et al., 2025). This pillar aligns with stakeholder-oriented governance frameworks (Freeman, 1984), emphasizing community welfare, employee well-being, and sustainable economic development.

Accountability (A) institutionalizes responsibility through governance structures such as independent boards, audit committees, and internal controls. Strong accountability mechanisms reduce fraud probability and enhance reporting transparency (Morin, 2024). By embedding responsibility within formal governance processes, this pillar ensures that both acquisition and utilisation of wealth remain aligned with ethical and long-term objectives.

Together, these five pillars form an integrated ethical-financial system capable of empirical operationalization. The framework can be quantified through measurable indicators such as ESG performance scores, discretionary accrual measures for earnings quality, governance indices, CSR effectiveness ratios, and leverage stability metrics. Techniques such as Principal Component Analysis (PCA), Confirmatory Factor Analysis (CFA), Panel Data Regression, and Structural Equation Modeling can validate the composite SHIVA Corporate Finance Index. Dependent variables may include Earnings Per Share (EPS), Tobin's Q, earnings quality, stock return volatility, and fraud probability, thereby linking ethical orientation with measurable financial outcomes.

Conceptually, the SHIVA framework differs from conventional finance models by moving beyond shareholder primacy toward stakeholder equilibrium, integrating moral intent alongside quantitative output evaluation, embedding sustainability within core strategic decision-making, and linking governance structures with intrinsic moral responsibility. While it offers a promising alternative to shareholder-centric finance, challenges may arise in empirical validation and institutional acceptance within predominantly profit-driven financial systems. Nevertheless, the growing emphasis on ESG integration, ethical governance, and long-term sustainability suggests an evolving financial landscape receptive to culturally grounded governance paradigms.

Table 1: SHIVA Model's proposed measurable indicators

Pillar	Conceptual Meaning	Financial Governance Focus	Practical Corporate Application	Measurable Indicators
S – Sustainability	Long-term equilibrium and preservation of balance	Intergenerational equity and stable growth	Capital preservation, optimal leverage, environmental responsibility	ESG score, debt sustainability ratio, long-term ROA stability, carbon disclosure index
H – Honesty in Acquisition	Ethical and transparent wealth generation	Integrity in revenue recognition and reporting	No earnings manipulation, tax compliance, transparent disclosures	Discretionary accruals (Modified Jones Model), audit quality, absence of regulatory penalties, fraud incidence rate
I – Intent-Based Allocation	Purpose-driven capital deployment	Moral evaluation of investment decisions	Investment in R&D, human capital, sustainable innovation	R&D intensity, human capital investment ratio, CSR effectiveness score, stakeholder satisfaction index
V – Value for Society	Inclusive and shared prosperity	Stakeholder-oriented wealth distribution	CSR programs, employee welfare, community development	CSR spending ratio, employee benefit ratio, social impact metrics, ESG social score
A – Accountability	Institutionalized responsibility	Governance transparency and oversight	Independent board, audit committees, whistleblower systems	Governance index, independent director %, audit committee strength, transparency index

The framework can be quantified as: SCFI = f (S + H + I + V + A)

The SHIVA Corporate Finance Index (SCFI), where SCFI represents the composite measure of Sustainability, Honesty in acquisition, Intent-based allocation, Value for society, and Accountability—can be empirically quantified as SCFI = f (S + H + I + V + A) and validated

using advanced statistical techniques such as Principal Component Analysis (PCA) for index construction, Confirmatory Factor Analysis (CFA) for construct validation, Panel Data Regression for testing longitudinal corporate impact, and Structural Equation Modeling (SEM) for examining causal relationships among governance dimensions. The effectiveness of the framework can be evaluated against key dependent variables including Earnings Per Share (EPS), Tobin's Q as a proxy for firm valuation, earnings quality indicators, stock return volatility, and fraud probability, thereby linking ethical governance with measurable financial outcomes. Conceptually, the SHIVA framework distinguishes itself from conventional financial models by moving beyond shareholder primacy toward stakeholder equilibrium, integrating moral intent alongside quantitative output evaluation, embedding sustainability within the strategic core rather than treating it as peripheral compliance, and linking governance mechanisms with intrinsic moral responsibility. As a result, it offers a culturally grounded yet analytically measurable governance paradigm that is suitable for both normative theoretical development and rigorous empirical investigation.

7. Comparison with Western Financial Theory

Western financial models primarily emphasize shareholder wealth maximization, risk-return optimization, and agency cost minimization. Profit is treated as the central objective, and governance mechanisms are designed to align managerial incentives with shareholder interests. While stakeholder theory and ESG frameworks have expanded the scope of responsibility, the foundational orientation remains predominantly economic.

In contrast, the Sanatan framework embeds finance within a moral order. Whereas Western models focus on output-based evaluation, the Sanatan perspective integrates both intent and outcome. Short-term metrics in conventional finance are replaced by long-term karmic sustainability. Shareholder primacy evolves into stakeholder balance. Compliance-driven ESG becomes ethically embedded sustainability. Risk management in Western theory often aims at volatility reduction; detachment in Sanatan thought seeks to regulate greed and preserve equilibrium. Thus, the divergence is not merely operational but philosophical. Western finance tends toward instrumental rationality; Sanatan finance integrates normative rationality. The former prioritizes market efficiency; the latter prioritizes moral balance. Yet, these paradigms need not be antagonistic. The Sanatan model can complement modern finance by providing ethical depth and cultural grounding.

8. Conclusion

The study concludes that financial management requires a shift from purely instrumental rationality toward an ethically integrated governance paradigm. The SHIVA Model demonstrates that Sanatan principles provide a coherent framework for aligning economic efficiency with moral accountability, sustainability, and stakeholder balance. By integrating Sustainability, Honesty in acquisition, Intent-based allocation, Value for society, and Accountability, the framework moves beyond shareholder primacy toward a stakeholder-oriented and long-term perspective. It complements modern governance reforms and ESG frameworks by embedding ethical intentionality within financial decision-making rather than treating responsibility as peripheral compliance. The model thus offers a culturally grounded yet analytically measurable alternative capable of enriching contemporary financial governance discourse.

9. Future Scope of the Study

Future research may empirically validate the SHIVA Corporate Finance Index (SCFI) across listed firms using panel data analysis to examine its impact on Earnings Per Share (EPS), Tobin's Q, earnings quality, stock return volatility, and fraud probability. The model can be validated through statistical techniques including Principal Component Analysis (PCA), Confirmatory Factor Analysis (CFA), Panel Data Regression, and Structural Equation Modeling (SEM). Comparative cross-country studies could explore whether culturally rooted governance models influence corporate resilience differently across institutional environments. Survey-based research may also assess managerial ethical orientation and its relationship with financial performance outcomes. Additionally, integrating the SHIVA framework into corporate governance policy design, sustainability reporting standards, and management education curricula offers promising avenues for applied research. Longitudinal studies examining the relationship between ethical orientation and long-term market stability may further strengthen the empirical foundation of Sanatan-based financial governance models.

References

Adams, C. A. (2015). The international integrated reporting council: A call to action. *Critical Perspectives on Accounting, 27*, 23–28.

Barton, D., & Wiseman, M. (2014). Focusing capital on the long term. *Harvard Business Review, 92*(1–2), 44–51.

Beasley, M. S. (1996). An empirical analysis of the relation between board of director composition and financial statement fraud. *The Accounting Review, 71*(4), 443–465.

Boatright, J. R. (2013). *Ethics in finance* (3rd ed.). Wiley-Blackwell.

Cho, C. H., Laine, M., Roberts, R. W., & Rodrigue, M. (2015). Organized hypocrisy, organizational façades, and sustainability reporting. *Accounting, Organizations and Society, 40*, 78–94.

Dechow, P. M., Ge, W., Larson, C. R., & Sloan, R. G. (2010). Predicting material accounting misstatements. *Contemporary Accounting Research, 28*(1), 17–82.

Eccles, R. G., & Klimenko, S. (2019). The investor revolution. *Harvard Business Review, 97*(3), 106–116.

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Pitman.

Fung, A., Graham, M., & Weil, D. (2010). *Full disclosure: The perils and promise of transparency*. Cambridge University Press.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. *Journal of Financial Economics, 3*(4), 305–360.

Morin, F. (2024). Governance transparency and corporate accountability in financial systems. *Journal of Corporate Governance Studies, 18*(2), 115–132.

Munteanu, V. P., Zuca, M., & Cîrciumaru, D. (2025). Ethical integration and financial performance: Evidence from European markets. *Journal of Sustainable Finance & Investment, 15*(1), 1–20.

Nasution, R. A., & Sibuea, M. B. (2024). Financial management effectiveness and sustainability performance: Evidence from emerging markets. *Sustainability Accounting Journal, 12*(1), 45–60.

Radhakrishnan, S. (1923). *Indian philosophy* (Vol. 1). Oxford University Press.

Sandel, M. J. (2012). *What money can't buy: The moral limits of markets*. Farrar, Straus and Giroux.

Sharma, A. (2000). *Classical Hindu thought: An introduction*. Oxford University Press.

Sinha, J. B. P. (2010). *Indian business culture*. Sage Publications.

Stout, L. A. (2012). *The shareholder value myth*. Berrett-Koehler Publishers.

Trevino, L. K., & Nelson, K. A. (2017). *Managing business ethics: Straight talk about how to do it right* (7th ed.). Wiley.

TARK TANSAKU
ISSN: (Applied)
Volume 1, Issue 1, March 2026
DOI:

Mutual Fund Participation and Stock Market Development in India: An Econometric Investigation

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Abstract: The Indian stock market has witnessed substantial transformation over the last two decades due to increasing participation of domestic institutional investors, particularly mutual funds and Asset Management Companies (AMCs). Mutual funds play a significant role in mobilizing household savings, improving financial inclusion, enhancing market liquidity, and supporting long-term capital market development. This study empirically investigates the relationship between mutual fund participation and stock market development in India during the period 2009–2024. The research employs econometric techniques including multiple regression analysis, Variance Inflation Factor (VIF), Chow Breakpoint Test, Quandt-Andrews Unknown Breakpoint Test, and Bai-Perron Multiple Breakpoint Test to examine the impact of various mutual fund investment activities on the SENSEX. The findings reveal that Mutual Fund Index Futures (MFIF) exert a statistically significant positive influence on stock market performance, indicating that derivative-based investment activities contribute meaningfully to market growth and liquidity creation. The study further identifies the existence of multiple structural breaks associated with major economic events such as demonetization, UPI expansion, and the COVID-19 pandemic, which significantly altered investor behaviour and financial market dynamics. The results confirm that mutual fund participation contributes positively toward financial market resilience, market stability, and the long-term development of the Indian stock market. The study provides important implications for policymakers, regulators, investors, and AMCs regarding the growing importance of domestic institutional investments in strengthening India's financial ecosystem.

Keywords: Mutual Funds, Asset Management Companies, Indian Stock Market, SENSEX, Market Development, Econometric Analysis, Structural Breaks, Financial Markets, Institutional Investors, Stock Market Performance.

1. Introduction:

The stock market plays a vital role in the economic development of any nation by facilitating capital formation, mobilizing savings, promoting industrial growth, and improving financial efficiency. A well-developed stock market enables businesses to raise long-term capital while simultaneously providing investment opportunities to individuals and institutions. In emerging economies such as India, the stock market has evolved significantly due to economic liberalization, technological advancement, financial reforms, and increasing participation from domestic and foreign institutional investors. Among various institutional participants, mutual

funds and Asset Management Companies (AMCs) have emerged as highly influential contributors to stock market development and financial market stability.

Mutual funds represent professionally managed investment vehicles that pool savings from retail and institutional investors and allocate them across diversified financial assets such as equities, bonds, derivatives, and money market instruments. The primary objective of mutual funds is to provide diversification, professional fund management, liquidity, and risk reduction to investors. In India, the mutual fund industry has witnessed remarkable growth over the last two decades due to increasing financial literacy, digital financial inclusion, rising disposable income, and regulatory support from the Securities and Exchange Board of India (SEBI). The introduction of Systematic Investment Plans (SIPs), digital investment platforms, and fintech innovations has further accelerated retail investor participation within mutual fund schemes.

The Indian mutual fund industry has become an important source of domestic institutional investment in the stock market. Traditionally, Indian stock markets were significantly influenced by Foreign Portfolio Investors (FPIs) and external global financial movements. However, during recent years, domestic mutual funds have increasingly emerged as stabilizing forces capable of counterbalancing volatile foreign capital outflows. The growing Assets Under Management (AUM) of Indian mutual funds indicate rising investor confidence in professionally managed investment mechanisms. This increasing participation of domestic institutional investors contributes toward improving market liquidity, reducing informational asymmetry, enhancing price discovery mechanisms, and promoting financial market resilience.

Mutual funds influence stock market development through multiple channels. Firstly, they increase market liquidity by participating actively in equity and derivative trading activities. Higher liquidity improves transaction efficiency and reduces market volatility. Secondly, mutual funds facilitate efficient capital allocation by directing household savings toward productive corporate investments. Thirdly, professionally managed mutual funds enhance investor confidence by reducing informational disadvantages and investment risks faced by retail investors. Finally, mutual fund participation contributes toward market depth and financial inclusion by enabling small investors to participate in capital markets through diversified investment portfolios.

The relationship between mutual fund activities and stock market performance has become increasingly important within the context of India's rapidly evolving financial ecosystem. The expansion of digital payment systems, online trading platforms, mobile investment applications, and algorithmic trading has transformed investment behaviour across financial markets. Simultaneously, major economic and policy events such as demonetization, the rapid adoption of Unified Payments Interface (UPI), and the COVID-19 pandemic have substantially altered financial market dynamics and investor psychology. These developments have increased the relevance of examining how mutual fund participation influences stock market growth and financial stability during periods of economic uncertainty and structural transformation.

India experienced a major structural economic shift during demonetization in 2016, which significantly impacted liquidity conditions, digital transactions, and investment behaviour. The promotion of digital financial systems and electronic transactions accelerated financial formalization and increased retail participation within financial markets. Similarly, the rapid

growth of UPI-based digital payments transformed the Indian financial ecosystem by improving accessibility, transaction convenience, and financial inclusion. These technological and policy developments indirectly influenced mutual fund investments and stock market participation patterns.

Another major event affecting financial markets was the outbreak of the COVID-19 pandemic in 2020. The pandemic created unprecedented economic disruption, market volatility, liquidity crises, and uncertainty across global financial systems. During this period, mutual funds played an important role in maintaining liquidity and investor participation despite significant market fluctuations. The pandemic also accelerated digital investment behaviour, online financial services, and retail investor engagement in stock markets. Consequently, understanding the relationship between mutual fund participation and stock market development during such structural disruptions becomes highly important for policymakers and financial institutions.

Several theoretical perspectives explain the relationship between institutional investments and stock market development. Efficient Market Hypothesis (EMH) suggests that institutional investors contribute toward market efficiency through better information processing and rational investment decisions. Portfolio Theory emphasizes diversification and risk optimization through professionally managed investment portfolios. Behavioural Finance Theory explains how investor sentiment, herding behaviour, and psychological biases influence mutual fund flows and stock market movements. Additionally, Financial Intermediation Theory highlights the role of mutual funds in mobilizing savings and allocating financial resources efficiently within the economy. These theoretical foundations indicate that increasing mutual fund participation may positively influence stock market growth, liquidity, and financial stability.

The significance of the study lies in its contribution toward understanding the growing role of domestic institutional investors within emerging financial markets. The findings of the study may help policymakers, regulators, financial institutions, and investors formulate strategies for strengthening financial market stability and encouraging sustainable capital market development. Furthermore, the research provides useful insights into how economic disruptions and technological transformations influence institutional investment behaviour and stock market dynamics within the Indian economy.

2. Literature Review

Oh and Parwada (2007) examined the relationship between mutual fund flows and stock market returns in Korea. The study identified a positive association between stock market performance and mutual fund investment flows, indicating that investors respond actively to market movements. The findings revealed that stock purchases by mutual funds increase during bullish market periods, contributing to higher market liquidity and volatility. The research highlighted the dynamic interaction between investor sentiment and market returns in emerging financial markets.

Hung et al. (2010) investigated mutual fund herding behavior and its impact on stock returns in the Taiwan stock market. The study found significant evidence of herding among mutual fund managers, particularly during periods of market uncertainty. The results suggested that collective investment decisions by fund managers influence stock price movements and increase market

volatility. The research concluded that institutional investment behavior can strongly affect stock market efficiency and investor confidence.

Massa (2004) analyzed the impact of mutual fund competition on stock market liquidity. The study argued that increasing competition among mutual fund families enhances trading activities and improves overall market liquidity. The findings demonstrated that higher mutual fund participation contributes positively to price discovery and market efficiency. The study emphasized the importance of institutional investors in strengthening the stability and functioning of financial markets.

Bose (2012) examined the relationship between mutual fund investments, foreign institutional investments (FII), and stock market returns in India. The study revealed a positive relationship between domestic mutual fund investments and stock market performance. It further found that mutual funds often adopt conservative and contrarian investment strategies during volatile periods. The research highlighted the growing importance of domestic institutional investors in stabilizing Indian stock markets.

Thenmozhi and Kumar (2009) studied the dynamic interaction among mutual fund flows, stock market returns, and market volatility in India. The study found bidirectional causality between stock market returns and mutual fund flows. It also reported that higher market volatility significantly influences investor investment decisions in mutual funds. The research emphasized the interconnected nature of mutual fund activity and stock market performance.

Alexandri (2015) investigated whether mutual fund performance is influenced more by stock selection ability or market timing capability. The findings indicated that successful stock selection contributes more significantly to fund performance than market timing strategies. The study also highlighted that fund managers with strong analytical capabilities achieve better portfolio returns. The research provided important insights into performance evaluation techniques for mutual funds.

Ederington and Golubeva (2011) explored the impact of stock market volatility expectations on aggregate mutual fund flows. The study found that investor expectations regarding future market volatility significantly influence mutual fund investment decisions. During periods of high uncertainty, investors tend to reduce equity mutual fund investments. The research demonstrated the behavioral sensitivity of investors toward anticipated market risk.

Shrider (2009) analyzed how poor stock market performance affects determinants of mutual fund flows. The study observed that during bearish market conditions, investors become more cautious and reduce mutual fund investments. The findings suggested that fund flow behavior depends significantly on prevailing market trends and investor confidence. The study concluded that market downturns substantially alter investment decision-making patterns.

Chen et al. (2013) evaluated the market timing and stock selection abilities of mutual fund managers in Taiwan using traditional and conditional approaches. The study found mixed evidence regarding managers' market timing capabilities, while stock selection skills showed relatively better performance. The findings highlighted the importance of managerial expertise in generating superior returns. The research contributed to understanding fund management

efficiency in Asian financial markets.

Kumar et al. (2020) investigated the relationship between stock market returns and mutual fund flows in India. The study identified a significant positive association between market returns and mutual fund investments. The findings indicated that investors tend to increase investments during rising market conditions. The research emphasized the role of investor sentiment and market confidence in influencing mutual fund participation.

3. Methodology

The present research paper adopts a descriptive and empirical research design to examine the impact of mutual fund participation on stock market development in India during the period from December 2009 to July 2024. The study specifically aims to analyse the relationship between various mutual fund investment activities and the performance of the Indian stock market represented by the SENSEX. The study is based on secondary time-series data collected from reliable financial sources including NSE, BSE, SEBI, AMFI, NSDL, and related institutional databases. A purposive sampling technique has been used to select variables directly relevant to the objectives of the study. The dependent variable of the study is the SENSEX, while the independent variables include Mutual Fund Debt Net (MFD), Mutual Fund Equity Net (MFE), Mutual Fund Index Futures (MFIF), Mutual Fund Index Options (MFIO), Mutual Fund Stock Futures (MFSF), and Mutual Fund Stock Options (MFSO). The study employs Multiple Regression Analysis to examine the impact of mutual fund activities on stock market performance. Further, the Variance Inflation Factor (VIF) technique is applied to test multicollinearity among explanatory variables. To identify structural changes caused by major economic events, the study additionally employs Chow Breakpoint Test, Quandt-Andrews Unknown Breakpoint Test, and Bai-Perron Multiple Breakpoint Test. These econometric techniques help in examining structural stability, regime shifts, and dynamic changes in the relationship between mutual fund activities and stock market behaviour during significant events such as demonetization, UPI expansion, and the COVID-19 pandemic. The statistical analysis was conducted using EViews software to ensure reliability, validity, and robustness of the econometric results.

4. Data Analysis

A time-series multiple regression model was estimated to investigate the relationship between mutual fund activities and stock market performance during the period 2009–2024. In this model, SENSEX was treated as the dependent variable, whereas various categories of mutual fund investments and trading activities were considered explanatory variables.

Table 1: Regression Analysis for the period 2009-2024

DEPENDENT VARIABLE	SENSEX		
	COEFFICIENT	**t**	Sig.
CONSTANT	17.7065	1.9911	0.0466
INDEPENDENT VARIABLES			
MFD	0.0001	0.03843	0.9693

MFE	-0.003	-0.4413	0.6591
MFIF	0.02003	3.42031	0.0006
MFIO	0.00031	0.48417	0.6283
MFSF	-0.0005	-1.896	0.058
MFSO	0.00297	0.5004	0.6168
R^2		0.00481	
F- value		2.69271	
Sig. F		0.01309	

The estimated regression results provide important insights into the association between mutual fund investment activities and stock market performance in India. The intercept term is positive and statistically significant, indicating that the market index maintains a positive base value even in the absence of explanatory variables.

Among all the independent variables included in the model, Mutual Fund Index Futures (MFIF) emerge as the only variable exerting a statistically significant positive influence on the SENSEX. The coefficient value of 0.0200 and probability value below 0.05 suggest that an increase in index futures trading activity by mutual funds contributes positively to stock market growth. This indicates that derivative-based investment participation by AMCs plays a meaningful role in supporting market expansion and liquidity creation.

In contrast, variables such as MFD, MFE, MFIO, and MFSO fail to exhibit statistically significant relationships with the SENSEX because their probability values remain higher than the prescribed significance level. This suggests that these forms of mutual fund investment activities do not individually influence stock market movements in a measurable manner during the study period. Further, MFSF shows a weak negative coefficient with marginal significance, implying a limited inverse association with market performance.

The coefficient of determination (R^2) remains relatively low, implying that mutual fund variables alone explain only a small proportion of changes in the SENSEX. This indicates that stock market movements are simultaneously affected by various macroeconomic, political, global, and behavioural factors. Nevertheless, the statistically significant F-statistic confirms the overall validity of the regression model.

Table 2: Variance Inflation Factor

Variable	Coefficient Variance	Uncentred VIF	Centred VIF
C	79.08167	1.722706	NA
MFD	7.06E-06	1.236220	1.028996
MFE	4.67E-05	1.152540	1.071591
MFIF1	3.43E-05	1.919129	1.919118
MFIO	4.11E-07	1.481754	1.015767
MFSF1	7.18E-08	1.698318	1.698309
MFSO1	3.53E-05	1.364674	1.364674

To verify the existence of multicollinearity among explanatory variables, the Variance Inflation Factor (VIF) technique was applied. Multicollinearity refers to a condition where independent

variables are highly correlated with one another, which may distort regression estimates and reduce the reliability of statistical results.

The VIF analysis confirms that the regression model does not suffer from multicollinearity issues. All centred VIF values are considerably below the commonly accepted threshold of 10, indicating low correlation among explanatory variables. The highest VIF value is associated with MFIF, but it still remains within acceptable limits. Therefore, the independent variables included in the model are statistically appropriate, and the estimated regression coefficients can be considered stable and reliable.

Table 3: Chow Breakpoint Test

Chow Breakpoint Test: 8/11/2016			
Null Hypothesis: No breaks at specified breakpoints			
Varying regressors: All equation variables			
Equation Sample: 12/02/2009 7/31/2024			
F-statistic	12.5454	Prob. F(7,3338)	0
Log likelihood ratio	87.04605	Prob. Chi-Square(7)	0
Wald Statistic	87.8178	Prob. Chi-Square(7)	0

Table 4: Chow Breakpoint Test

Chow Breakpoint Test: 1/02/2020			
Null Hypothesis: No breaks at specified breakpoints			
Varying regressors: All equation variables			
Equation Sample: 12/02/2009 7/31/2024			
F-statistic	13.51353	Prob. F(7,3338)	0.0000
Log likelihood ratio	93.67035	Prob. Chi-Square(7)	0.0000
Wald Statistic	94.59468	Prob. Chi-Square(7)	0.0000

The Chow Breakpoint Test was employed to identify whether major economic and policy events caused structural changes in the relationship between mutual fund activities and stock market performance. The test examines whether regression coefficients remain stable before and after a specific economic event.

The results indicate the presence of a significant structural break during the demonetization and UPI implementation period in India. The highly significant probability values reveal that this economic event substantially altered the relationship between mutual fund activities and stock market behaviour. The rapid expansion of digital payment systems, shifts in investor behaviour, and changes in transaction patterns contributed to a transformation in financial market dynamics during this period.

The second breakpoint analysis corresponds to the outbreak of the COVID-19 pandemic. The statistically significant results confirm the existence of a major structural shift during this

period. Lockdowns, economic uncertainty, market volatility, and changing investment behaviour significantly affected stock market operations and mutual fund investment patterns. These findings suggest that the pandemic disrupted existing financial relationships and introduced a new behavioural pattern within the Indian stock market.

Table 5: Quandt-Andrews unknown breakpoint test

Null Hypothesis: No breakpoints within 15% trimmed data		
Varying regressors: All equation variables		
Equation Sample: 12/02/2009 7/31/2024		
Test Sample: 5/25/2012 6/21/2022		
Number of breaks compared: 2347		
Statistic	**Value**	Prob.
Maximum LR F-statistic (3/24/2020)	15.38539	0.0000
Maximum Wald F-statistic (3/24/2020)	107.6977	0.0000
Exp LR F-statistic	5.852808	
Exp Wald F-statistic	48.69018	0.0000
Ave LR F-statistic	8.337975	0.0000
Ave Wald F-statistic	58.36582	0.0000
Note: probabilities calculated using Hansen's (1997) method		

The Quandt-Andrews Unknown Breakpoint Test was used to identify structural breaks without pre-determining the exact breakpoint date. The technique evaluates multiple possible breakpoints throughout the study period and identifies the most statistically significant structural change. The Quandt-Andrews test identifies a highly significant structural break around March 2020, which corresponds to the nationwide lockdown phase during the COVID-19 pandemic. The low probability values strongly reject the null hypothesis of no structural break. These findings indicate that the pandemic drastically changed the relationship between mutual fund activities and stock market performance. The disruption influenced investor sentiment, market volatility, liquidity conditions, and financial decision-making across the economy.

Table 6: Bai-Perron Multiple breakpoint test

Bai-Perron tests of L+1 vs. L sequentially determined breaks			
Date: 11/11/24 Time: 13:12, Sample: 12/01/2009 7/31/2024			
Included observations: 3352			
Breaking variables: C MFD MFE MFIF1 MFIO MFSF1 MFSO1			
Break test options: Trimming 0.15, Max. breaks 5, Sig. level 0.05			
Sequential F-statistic determined breaks: 3			
Break Test	**F-statistic**	**Scaled F-statistic**	Critical Value**
0 vs. 1 *	15.38539	107.6977	21.87
1 vs. 2 *	15.40839	107.8588	24.17
2 vs. 3 *	4.261640	29.83148	25.13
3 vs. 4	2.464441	17.25109	26.03
* Significant at the 0.05 level.			
** Bai-Perron (Econometric Journal, 2003) critical values.			

Sr.	Break Dates	
	Sequential	Repartition
1	3/24/2020	2/23/2017
2	2/23/2017	3/24/2020
3	6/17/2022	6/17/2022

The Bai-Perron Multiple Breakpoint Test was further applied to identify multiple structural shifts occurring across the study period. This method is particularly useful in detecting several regime changes in long-term financial and economic data.

The Bai-Perron analysis confirms the existence of multiple structural breaks in the relationship between mutual fund activities and stock market performance. The first major structural shift observed in March 2020 is associated with the economic disruption caused by the COVID-19 pandemic. The second breakpoint in February 2017 reflects the long-term consequences of demonetization and rapid digital financial transformation in India. The third breakpoint identified in June 2022 represents market adjustments during the post-pandemic recovery period, including inflationary pressures, monetary tightening, and global economic uncertainty. These structural breaks highlight the dynamic nature of financial markets and indicate that external economic and policy shocks significantly influence the relationship between mutual fund investment behaviour and stock market performance.

5. Major Findings

1. The empirical analysis reveals that Mutual Fund Index Futures (MFIF) exert a statistically significant positive impact on the Indian stock market, indicating that derivative-based trading activities of AMCs contribute meaningfully toward market growth and liquidity generation.

2. Other mutual fund investment categories such as MFD, MFE, MFIO, and MFSO do not individually demonstrate significant effects on stock market performance during the study period.

3. The VIF analysis confirms the absence of serious multicollinearity among explanatory variables, ensuring the reliability of regression estimates.

4. The Chow Breakpoint Tests reveal that major economic events such as demonetization, UPI expansion, and the COVID-19 pandemic created substantial structural changes in the Indian financial system and stock market behaviour.

5. The Quandt-Andrews and Bai-Perron tests further validate the existence of statistically significant structural shifts, especially during the COVID-19 period.

6. Overall, the findings suggest that growing mutual fund participation has increasingly contributed toward market stability, financial resilience, and the long-term development of the Indian stock market.

6. Conclusion

The present study examined the relationship between mutual fund participation and stock market development in India using econometric techniques for the period 2009–2024. The empirical findings reveal that Mutual Fund Index Futures (MFIF) have a statistically significant positive influence on the SENSEX, indicating that derivative-based participation of Asset Management Companies contributes meaningfully toward market growth, liquidity creation, and financial market development. However, other categories of mutual fund activities such as MFD, MFE, MFIO, and MFSO did not individually exhibit statistically significant effects on stock market performance during the study period. The VIF analysis confirmed the absence of serious multicollinearity among explanatory variables, thereby ensuring the reliability of the regression estimates. Further, the Chow Breakpoint Test, Quandt-Andrews Test, and Bai-Perron Multiple Breakpoint Test identified significant structural shifts in the Indian financial system during major economic events including demonetization, digital financial transformation through UPI expansion, and the COVID-19 pandemic. These structural breaks demonstrate that investor behaviour, market liquidity, and stock market dynamics are highly sensitive to economic disruptions and policy changes. Overall, the study concludes that increasing mutual fund participation has contributed positively toward enhancing market resilience, supporting financial stability, and strengthening the long-term development of the Indian stock market. The findings of the study provide useful implications for policymakers, regulators, investors, and financial institutions in promoting sustainable and stable capital market growth in India.

References

Albuquerque, R. A., Koskinen, Y., & Santioni, R. (2021). *Mutual fund trading and ESG stock resilience during the COVID-19 stock market crash* (SSRN Working Paper No. 3928774). SSRN. https://doi.org/10.2139/ssrn.3928774

Albuquerque, R., Koskinen, Y., & Santioni, R. (2021). *Mutual fund loyalty and ESG stock resilience during the COVID-19 stock market crash* (ECGI Working Paper Series in Finance No. 746/2021). European Corporate Governance Institute.

Alexandri, M. B. (2015). Mutual fund performance: Stock selection or market timing. In *Proceedings of the International Conference on Economics and Banking (ICEB-15)* (pp. 112–118). Atlantis Press. https://doi.org/10.2991/iceb-15.2015.17

Alkassim, F. (2009). *Mutual fund performance: Evidence of stock selection and market timing ability from Islamic mutual funds* (Doctoral dissertation, Bangor University).

Benos, E., & Jochec, M. (2011). Short term persistence in mutual fund market timing and stock selection abilities. *Annals of Finance, 7*(2), 221–246. https://doi.org/10.1007/s10436-010-0173-3

Bose, S. (2012). Mutual fund investments, FII investments and stock market returns in India. *Money & Finance, ICRA Bulletin*, September, 25–42.

Chen, D. H., Chuang, C. L., Lin, J. R., & Lan, C. L. (2013). Market timing and stock selection ability of mutual fund managers in Taiwan: Applying the traditional and conditional approaches. *Investment Management and Financial Innovations, 10*(2), 25–38.

Chopra, M. P. (2011). Do Indian mutual fund managers select the stock and time the market correctly? *IUP Journal of Applied Finance, 17*(4), 58–72.

Chordia, T., Sarkar, A., & Subrahmanyam, A. (2001). Common determinants of bond and stock market liquidity: The impact of financial crises, monetary policy, and mutual fund flows. *Federal Reserve Bank of New York Working Paper Series*, 1–42.

Das, S., & Sett, K. (2025). Evaluating stock selection and market timing abilities of mutual fund managers. *IUP Journal of Financial Risk Management, 22*(1), 44–58.

Ederington, L. H., & Golubeva, E. V. (2011). *The impact of stock market volatility expectations on investor behavior: Evidence from aggregate mutual fund flows* (SSRN Working Paper No. 1782009). SSRN. https://doi.org/10.2139/ssrn.1782009

Hung, W., Lu, C. C., & Lee, C. F. (2010). Mutual fund herding and its impact on stock returns: Evidence from the Taiwan stock market. *Pacific-Basin Finance Journal, 18*(5), 477–493. https://doi.org/10.1016/j.pacfin.2010.06.001

Khan, A. Y. (2020). Relationship between mutual fund flows, stock market return and the economy: Evidence from Pakistan. *International Journal of Financial Services Management, 10*(3), 245–261. https://doi.org/10.1504/IJFSM.2020.111108

Kumar, P., Saxena, C., & Gupta, A. K. (2020). A study on relationship between stock market returns and mutual fund flows. *Journal of Commerce and Accounting Research, 9*(1), 15–23.

Mansor, F., & Bhatti, M. I. (2011). The Islamic mutual fund performance: New evidence on market timing and stock selectivity. *International Conference on Economics and Finance Proceedings*, 77–85.

Massa, M. (2004). *Mutual fund competition and stock market liquidity* (SSRN Working Paper No. 667962). SSRN. https://doi.org/10.2139/ssrn.667962

Mehta, D. (2014). Evaluating the stock selection skills and market timing abilities of Indian mutual fund managers. *CLEAR International Journal of Research in Commerce & Management, 5*(7), 34–41.

Oh, N. Y., & Parwada, J. T. (2007). Relations between mutual fund flows and stock market returns in Korea. *Journal of International Financial Markets, Institutions and Money, 17*(2), 140–151. https://doi.org/10.1016/j.intfin.2005.09.001

Rahman, A. H., Amirah, A., & others. (2018). Stock selection and market timing ability analysis of investment manager in equity mutual fund Sharia in Indonesia. *International Conference on Applied Science and Technology Proceedings*, 45–52.

Roy, S. K., Das, N. N., Bhasin, N. K., & others. (2024). Empowering robo-advisors: Data-driven mutual fund and stock market price prediction with deep learning techniques. In *2024 Third International Conference on Intelligent Systems and Machine Learning* (pp. 1–6). IEEE.

Shawky, H. A., & Smith, D. M. (2005). Optimal number of stock holdings in mutual fund portfolios based on market performance. *Financial Review, 40*(4), 481–495. https://doi.org/10.1111/j.1540-6288.2005.00120.x

Shrider, D. G. (2009). Running from a bear: How poor stock market performance affects the determinants of mutual fund flows. *Journal of Business Finance & Accounting, 36*(1–2), 254–270. https://doi.org/10.1111/j.1468-5957.2009.02149.x

Sukarno, A., Oetomo, H., Sutanto, H., Liestyana, Y., & others. (2024). The influence of market timing ability, stock selection skill, fund age, and fund size on the performance of Sharia mutual funds. *Equator Journal of Management and Entrepreneurship, 12*(1), 55–67.

Thenmozhi, M., & Kumar, M. (2009). *Dynamic interaction among mutual fund flows, stock market return and volatility* (NSE Research Paper). National Stock Exchange of India.