ARTIFICIAL INTELLIGENCE, SUSTAINABILITY AND ENERGY SECTOR: A BIBLIOMETRIC ANALYSIS

Vandana Jain*, Kinneri Jain **, Naveen Mittal***

*Associate Professor, Department of Commerce, Shri Ram College of Commerce, University of Delhi, India

** Corresponding Author, Associate Professor, Department of Commerce, Shri Ram College of Commerce, University of Delhi, India

***Associate Professor, Department of Commerce, Shri Ram College of Commerce, University of Delhi, India

E-mail: drvandana.jain@srcc.du.ac.in

kinneri.jain@srcc.du.ac.in

naveen.mittal@srcc.du.ac.in

Abstract

The present paper aims to conduct a literature review using bibliometric analysis to understand the relationship between artificial intelligence, sustainability, and energy sector-related publications in journals indexed in the Scopus Database for the period 2004 to 2023. The study has conducted two bibliometric analysis, namely Network analysis and Science mapping to study what have been various important journals, authors, and countries producing significant publications as well as what have been influential collaborations between authors, co-citation between article sas well as thematic analysis of the study. Performance analyses reveal that China followed by the USA and India have been the leading countries in producing research work in this domain, authors like Quammi, and Saciler are the influential authors in this field and the Journal of Cleaner Production and Sustainability are the twoleading journals with a High H index. Co-citation analyses show research carried around clusters like 'sustainable development goals, agenda 2030, and transforming our world' as themes. The thematic analysis reveals motor themes like decision making while niche themes like energy efficiency and energy utilization are also revealed. Our study concludes by suggesting that further research in the domain of energy efficiency using AI while incorporating sustainable means is the need of the hour given the rising climate extremists. It is significant for academia, industry as well as policy makers to ensure cleaner and sustainable energy solutions are crafted for our society.

Keywords: Artificial Intelligence, Sustainability, Energy Sector, Bibliometric Analysis

Introduction

Preserving the resources of energy is of utmost need today looking at scarcity of various resources of energy. The demand for energy is increasing worldwide and hence its posing challenges for optimum energy utilization and management (Makala *et al.,* 2020). Twentieth century has explored artificial intelligence and machine learning widely and the technology now prudently aids the human decision–making at the same time stimulating humans' learning (Entezari *et al.,* 2020). Energy system is a system which is integrated in nature hence it is not easy to conserve energy but given the new machine age, it is possible to evaluate optimum supply and demand (Entezari *et al.,* 2020). The developed nations are already making use of artificial intelligence and related technologies for optimum and efficient utilization of power sector. Sustainable Development Goal (SDG) 7 "*affordable, reliable, sustainable and modern energy for all*" has a primary object of providing affordable, reliable and sustainable modern energy for the development of agriculture, business, communications, education, healthcare and transportation worldwide. Today, the global average surface temperature is around 1.2^0C above pre-industrial levels, leading to heat waves and other extreme events. The energy sector has been found to be the primary cause of air pollution, more than 90% of the world's population is forced to breathe such polluted air leading to more than 6 million premature deaths a year (IEA, 2023). Investment in clean energy has risen by 40% since 2020 due to economic pressure to bring down emissions, drive towards energy security, inclination towards mature clean energy technologies like solar PV and electric vehicles which provide hope for the way forward (IEA, 2023). It can be seen from **Figure 1** that CO_2 emissions from different types of fossil fuels like oil, natural gas and coal have remained consistent largely till 2019 with a subsequent dip during Covid and then following the recovery from Covid-19, CO_2 emissions have definitely seen a major increase by all three fossil fuels. This is definitely an alarming situation, making both the policymakers as well as the industry ponder over how the increasing energy requirements need to be met with cleaner and greener alternative sources of energy. **Figure 2**, highlights that the largest CO_2 emitter in the world is China followed by USA, India and Japan, Except India, the other three countries are developed while India is a rapidly growing developing country. As the energy requirements in these countries soar higher and higher, so is the amount of pollution being released by industries in these countries. While the ongoing increase in energy demands and resultant increase in levels of CO_2 emissions is threatening the very existence of humankind, the sensitivity of human race towards developing

alternative sources of energy is also heartening. **Figure 3** highlights the annual cleaner energy investments during the period 2015-23. The accelerated investments in cleaner and greener energy exhibit increasing awareness among industry and society for creating and nurturing alternative cleaner sources of energy.
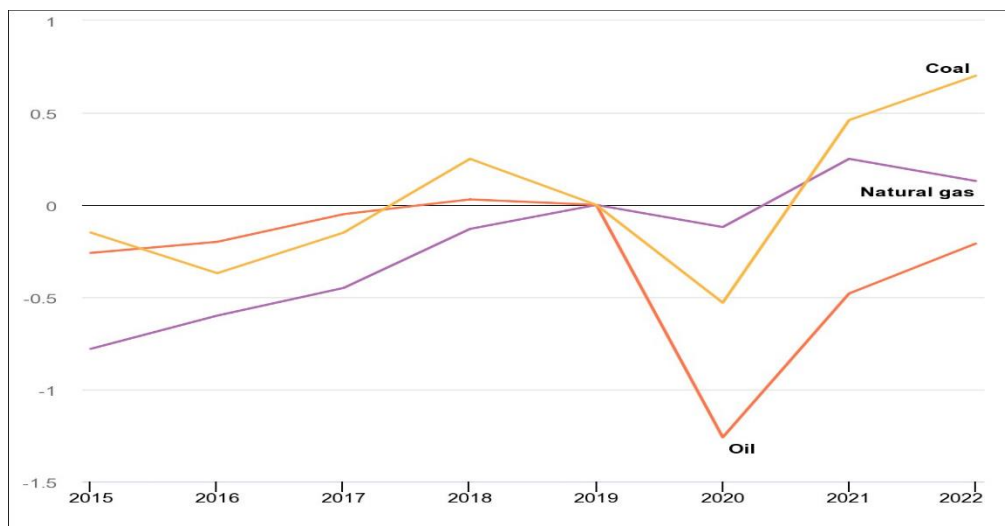
Figure 1: Change in global CO2 emissions by fuel, 2015-2022

Source: www.iea.org/data and statistics
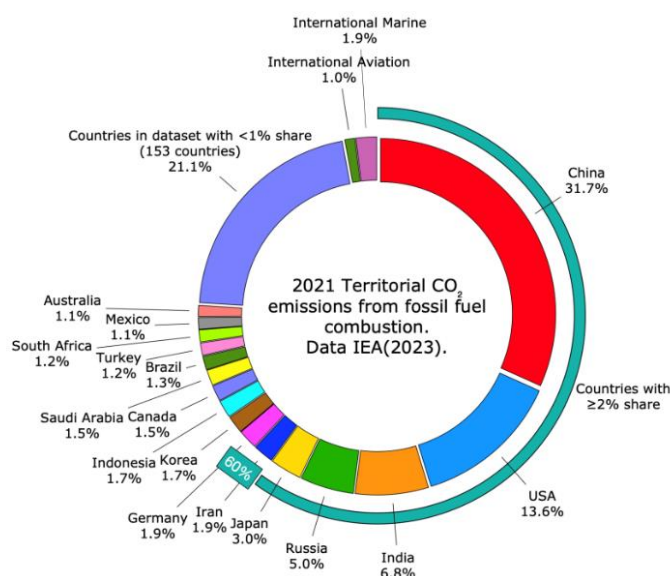
Figure 2: Territorial Fossil Fuel CO₂ Emission

Source: EA Greenhouse Gas Emissions from Energy Highlights, 2023
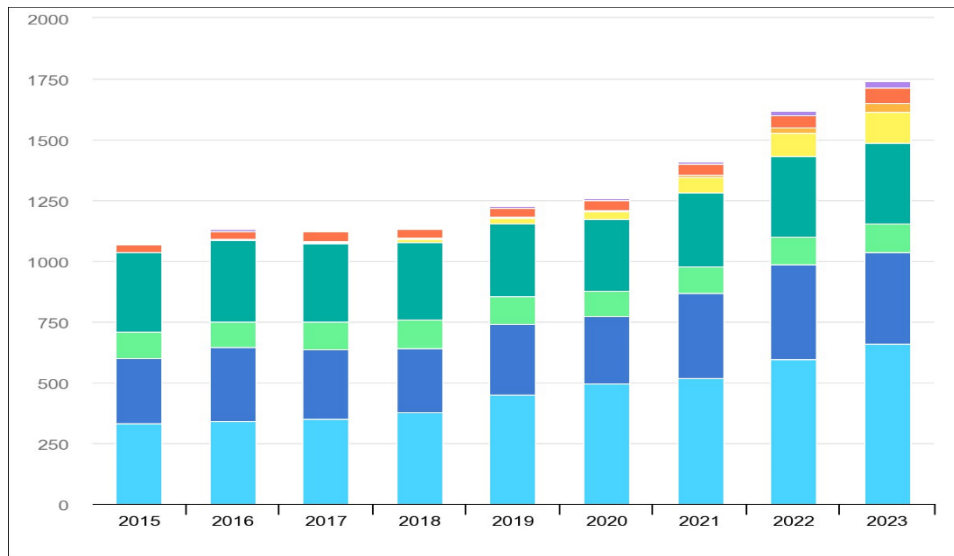
Figure 3: Annual Clean Energy Investments 2015-23

Source:www.iea.org/data and statistics

The world added 50% more renewable capacity in 2023 than in 2022 while solar PV makes for 3/4th of additions worldwide, according to Renewables 2023, the latest edition of the IEA's annual market report on the sector.

1. Literature Review

1.1 An overview of Artificial Intelligence and sustainability

Artificial Intelligence (AI) refers to how machines can be made intelligent through science and engineering. AI deals with designing intelligent computer programs and technology in conformity with environment to achieve efficiency in various sectors like energy, agriculture, industry, academia etc. (Makala, 2020). AI can assist human resources in lowering energy cost, cutting energy waste, facilitating and increasing the use of clean renewable energy resources and provide clean and cheap energy worldwide thus contributing to development. Energy industry, power system operators will have to integrate their traditional set ups with AI technologies, if they want to achieve efficiency and growth. Global economy is greatly dependent on energy production, distribution planning and financial stability (Ahmad *et al*., 2018).

AI techniques are today used in big data handling preventing cyber-attacks, smart grids, internet of things (IOT), robotics, energy efficiency optimization and computational efficiency (Kow *et al.,* 2016).

Predicting technologies are used in forecasting fossil fuels and renewable energy resources generation demand and price   etc. (Ranaweera *et al.*, 1997). It is widely known and accepted how well AI can plan and forecast load demand (Kong *et al.*, 2018), Solar energy (Rodriquez *et al*., 2018), wind energy (Ren *et al*. 2015), Hydro and geothermal energy (Debnath and Mourshed, 2018). A bibliometric analysis is required to synchronize the literature in this field, to determine its scope, trends and unexplored themes to facilitate future research in this field.

1.2 An overview of bibliometric analysis

Bibliometrics is a commonly used statistical approach for organizing research fields (Van Eck and Waltman, 2010). The current state, scope of the field, latest developments and future research directions can be investigated using bibliometric analysis (Tunger and Eulerich, 2018; Castriotta et al., 2019). According to Xu et al. (2018), bibliometric analysis is a useful technique for organizing massive amounts of data quantitatively and spotting long-term trends in a certain sector. Performance analysis and science mapping methodologies are included in the bibliometric study (Donthu*et al.,* 2021). Performance analysis evaluates the contributions that various research components—such as journals, nations, authors, articles, and institutions—make to a certain topic. It ranks research components according to their effectiveness in the field and employs a number of criteria to evaluate the influence of each component (Cobo *et al.,* 2011; Zupic and Cater, 2015; Donthu *et al.,* 2021).The goal of science mapping is to depict the dynamic organization and structure of scientific domains (Zupic and Cater, 2015). Science mapping examines the links between research components as well as their structural and conceptual relationships (Cobo *et al.,* 2011). Bibliographic coupling, coauthorship, co-word, co-citation, and citation analyses are all included in science mapping. These methods can be used to describe the intellectual and bibliographic organization of an area in conjunction with network analysis. A publication's impact in citation analysis is determined by the number of citations it has (Donthu *et al.,* 2021). Coauthorship analysis can provide the social structure of the field and show cooperative efforts (Zupic and Cater, 2015). According to Kumar et al. (2021), keyword co-occurrence analysis makes the assumption that frequently occurring terms in a given article have a conceptual relationship, show temporal

patterns, and organize into clusters connected to the same theme. Based on their common appearance in the bibliographies of other published works, co-citation analysis establishes a connection between two publications (Zupic and Cater, 2015; Donthu *et al*., 2021). According to Rossetto et al. (2018), co-citation analysis can provide insight into the conceptual framework of a certain topic of study. It helps academics locate the most scholarly foundations, original publications, and significant research papers. Articles with comparable citation patterns can be grouped using bibliographic coupling. This makes it easier to comprehend the recurring themes that the author addresses.

2. *Objective of the study*

The study aims to conduct literature review on the topic use of AI and Sustainable Energy Solutions through articles published in social science database Scopus from 2004-2023. This is primarily done to achieve the following objectives:

o Conduct Performance Analysis of the research topicto reveal influential authors, publications, countries and journals and

o Conduct Science Mapping of the research topic, to reveal collaboration network, relevant research trends and scope for future research of the topic.

3. *Data & Methodology*

The study is based on the articles being published in Scopus database over a period 2004-2023.The Scopus database is an online social science database, having 20% more citation analysis than web of sciences and having wider journal coverage(Mongeon and Paul-Hus, 2016; Mishra *et al*., 2021). Google scholar is not used for credibility issues (Falagas*et al*., 2008).The basis for the analysis is the bibliographical descriptions of articles and their references from academic journals listed in Scopus database. The Scopus database was searched using the keyword the "Artificial Intelligence", "Sustainability" and "Energy" as a part of a title, abstract, or keyword to compile a bibliography of all manuscript related to this topic of research. Out of the initial search of 938 articles, final articles were limited to 412, after limiting them to English language and document type being "Article". Using the data set, various Bibliometric graphs, tables and maps were drawn and analyzed in Biblioshiny (Aria and Cuccurullo, 2017).

4. *Results and Analysis of Data*

Table 1 exhibits the bibliographical key information related to research on data extracted from Scopus database. The documents were published in 222 sources and had an average citation per document of 21.25, indicating significant research undertaken during the relevant period of study. Total of 412 articles represent the relevant articles covering the topic of research. Of the authors, percentage of international co-authorship is 36.89% while the single author documents in this area are 30. We also found out that the co-authors per documents are 4.3. The international collaboration on this topic has not been very encouraging and definitely shows greater need to collaborate among authors at the international level. Figure 4 shows the distribution of research documents subject wise, showcasing that major research documents have been contributed by engineering sector making 18% of all documents under the study, followed by document from fields of energy, computer science, environmental science, social science, management and business subjects. This shows growing interest for research among researchers hailing from diverse subjects.

Table 1: Description of extracted documents by Scopus

Main Information About Data	Figures
Timespan	2004:2023
Sources (Journals, Books, etc)	222
Documents	412
Document Average Age	2.55
Average citations per doc	21.25
References	27172
DOCUMENT CONTENTS	
Keywords Plus (ID)	3547
Author's Keywords (DE)	1588
AUTHORS	
Authors	1645
Authors of single-authored docs	29
AUTHORS COLLABORATION	
Single-authored docs	30
Co-Authors per Doc	4.3
International co-authorships %	36.89
DOCUMENT TYPES	
Article	412
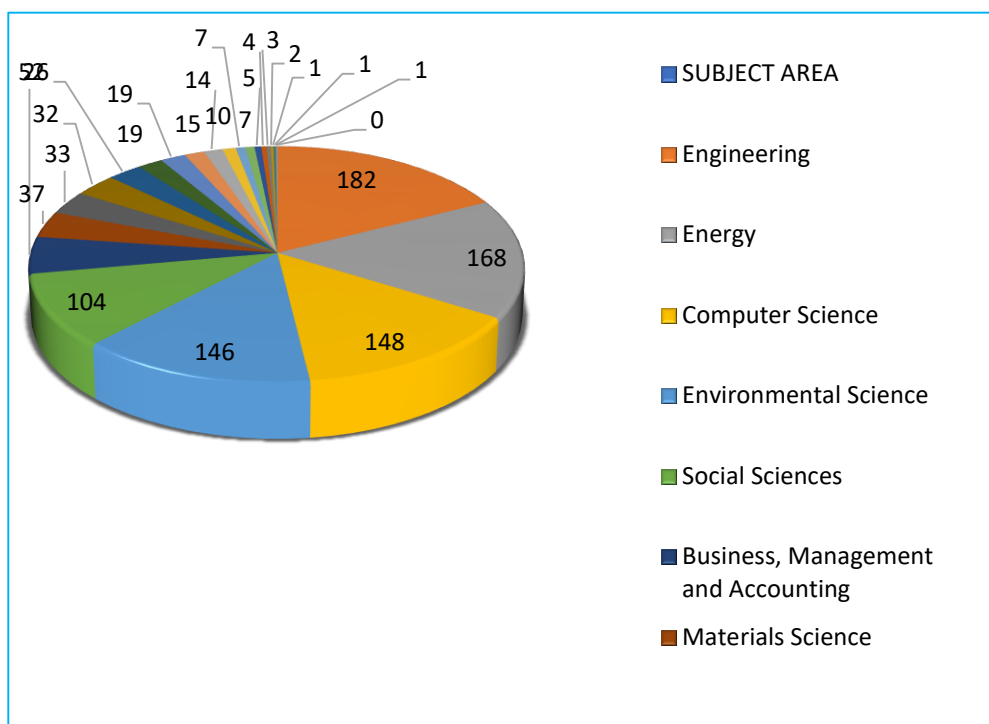
Figure 4: Documents - Subject wise Distribution

4.1 Performance Analysis

In performance analysis, annual publication and citation counts are frequently used. According to Donthu et al. (2021), the former signifies output, whereas the latter shows influence and impact. In **Figure 5**, production of articles by leading authors is depicted. Quammi and Saciler have produced articles in AI and sustainability domain largely during the period from 2010 to 2012, while authors like Tayebi and Huang have produced their research work from the year 2018 onwards. The figure reflects citations as well, where in for authors like Tayebi, Kumar, Huang and Zhang significant citation have taken place especially towards the last 4-5 years depicting the rising interest among academia to research in this field. **Figure 6**, shows the most influential authors with number of articles being 5 each for Quammi and Saciler and authors like Tayebi, Zhang, Huang and Kumar having 4 articles each. **Figure 7** reflects the sources' local impact factor by H Index. It shows top 10 journals ranked by the H-index based on the effect and productivity of their citations (Ingale and Paluri, 2022). It shows the journal of "Cleaner Production" has H index of 15 showing that each of its 15 published articles has received at least15 citations. The next leading journal is "Sustainability" (Switzerland) having an H index of 13. The other relevant journal include 'Energies', 'Sustainable cities and towns', 'Sustainable energy technologies and Assessment' and applied sciences among others,

displaying the authors' productivity over the period. Quammi has an H-index of 18, indicating that each of their 18 published articles have received at least 18 citations.

4.2 Science Mapping

Techniques like Co- citation analysis and co-authorship analysis are used in science mapping. Co- citation analysis reveals network maps containing nodes that show acited reference. The size of the nodes inform about the number of documents that have been co-cited.In **Figure 9,**Co-citation analysis reveal clusters like sustainable development goal, Agenda 2030 and transforming our world, indicating that various research articles are written around these themes. Co-authorship analysis depict the collaborative efforts between various authors. **In figure 10**, the international collaboration between scholars is shown. The co-authorship ties emphasizes important authors and their groupings. Through the collaboration network, the significant authors like Quammi, Saciler, Kumar, Huangetc are revealed. The amount of collaborations between academics from different countries is shown by the thickness of the lines, while the blackness of a country's colour denotes the frequency of collaborations. In Figure 10, international collaboration between authors like Quammi and Saciler, between authors like Kumar, Agarwal and Gehlot and between authors like Chen, Guo and Chang are shown. A number of clusters show cooperative organizations, where most of the writers are from the same or nearby nations. The authors' limited geographic concentration limits their ability to share information with one another.

4.3 Thematic Analysis

 The Thematic map is made up of X and Y axis. In the thematic map, the X- and Y-axes, respectively, represent centrality and density. While centrality refers to the degree of a network's engagement with another network and the significance of a specific domain in the research area, density indicates the degree to which a subject has grown in literature and the internal dependability of a given network (Wilczewski and Alon, 2023). Higher density and centrality motor themes, which denote well-developed and pertinent subjects, are displayed in the upper right quadrant.

In **Figure 11**, in the right quadrant, mature and well developed themes like decision support systems are revealed depicting extensive work in this domain. The research on topics like artificial intelligence, sustainable development and sustainability have been growing at

steadfast pace rendering these topics in the domain of basic themes. As the world battles, extreme climate turmoil at an increasing rate, the need to leverage technology for resolving energy problems becomes pertinent, giving rise to niche themes like

energy efficiency and energy utilization. The different quadrants in the thematic map reflect evolution of advanced research topics in this area highlighting the need to integrate technology spill overs to solve real life problems.
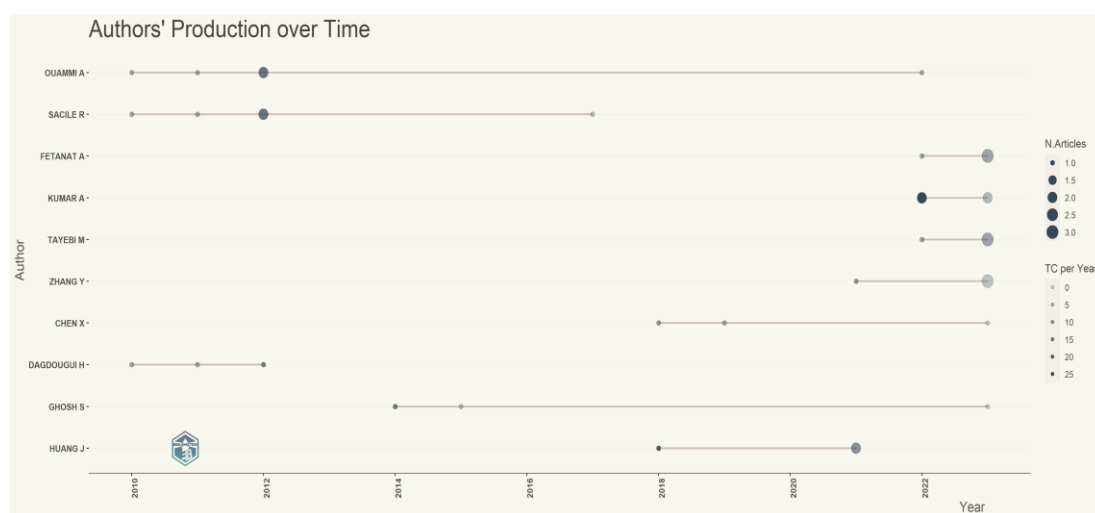
Figure 5: Author's productivity

Sources: Authors' Compilation using Biblioshiny
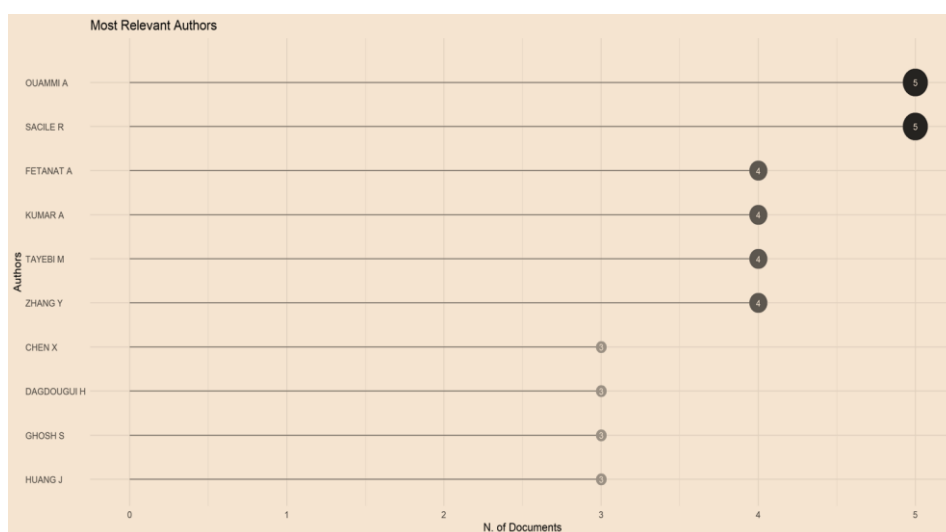
Figure 6 : Most influential Authors

Sources: Authors' Compilation using Biblioshiny
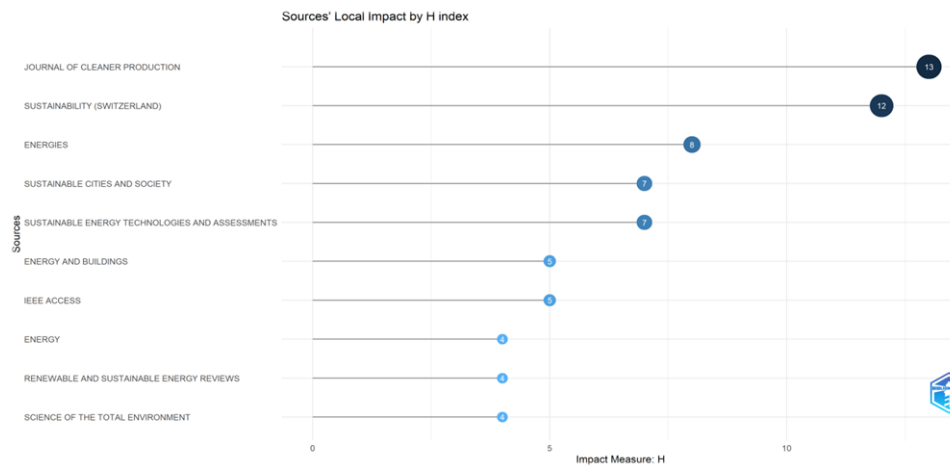
Figure 7 : Sources Local Impact by H Index

Sources: Authors' Compilation using Biblioshiny
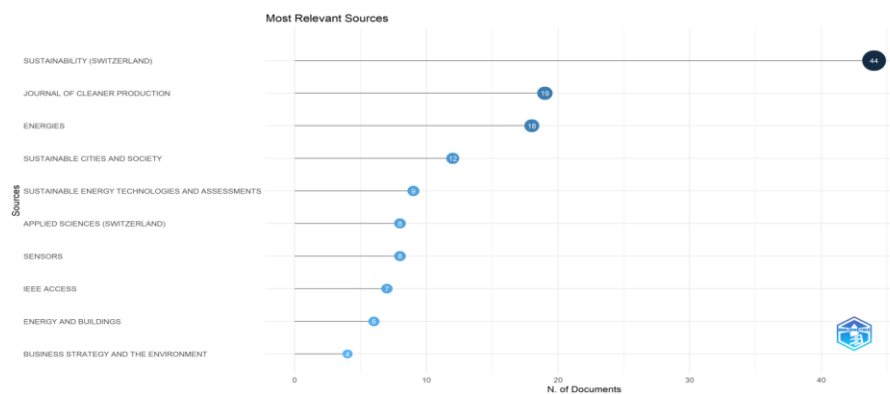
Figure 8: Most relevant Sources

Sources: Authors' Compilation using Biblioshiny
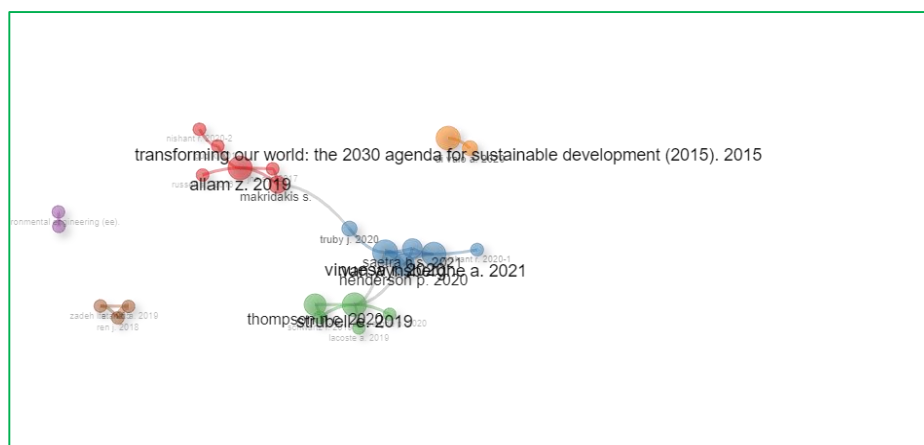
Figure 9: Co-citation Network Map

Sources: Authors' Compilation using Biblioshiny
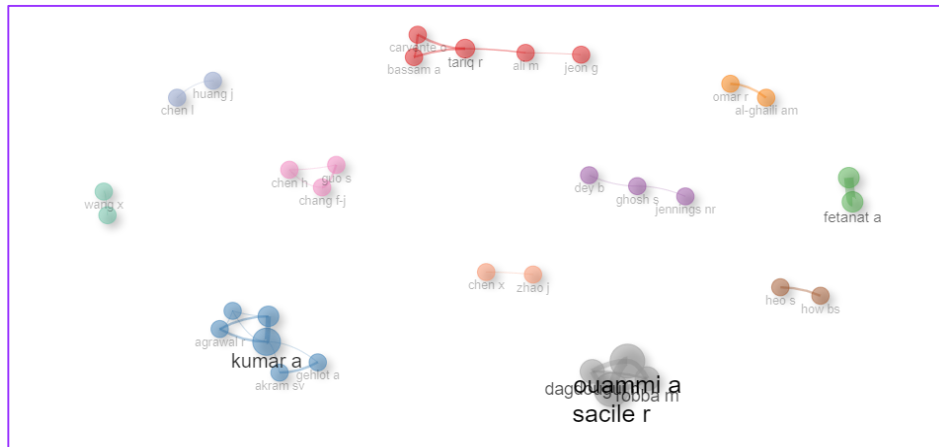
Figure 10: Collaboration network among Authors

Sources: Authors' Compilation using Biblioshiny
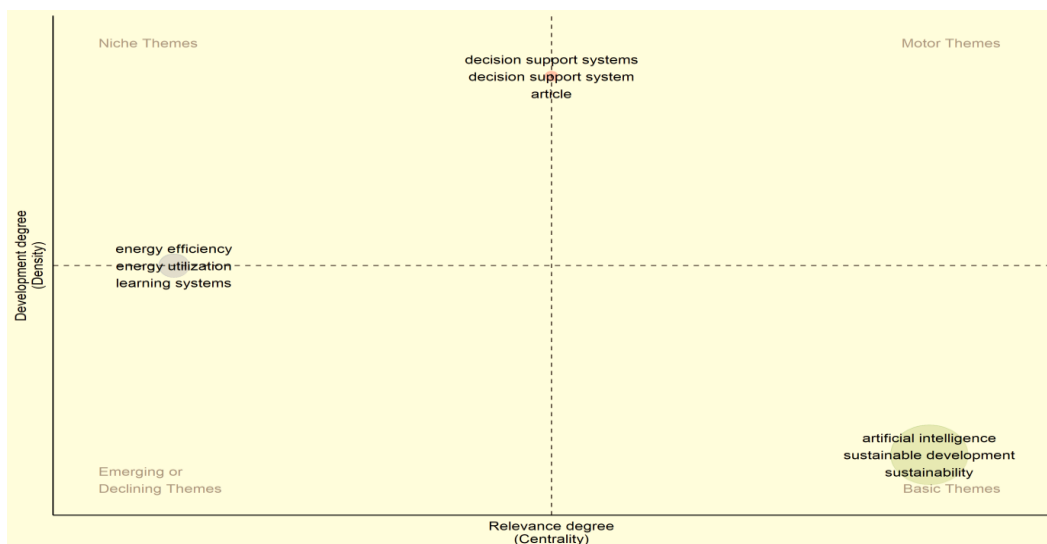
Figure 11: Thematic Map

Sources: Authors' Compilation using Biblioshiny

5   *Limitations of the study*

The study is consisting of primarily Scopus data base, other sources like Web of Science and SCSCI can also be considered for more engaging view. The paper is also subject to authors' personal experience and proficiency in application of software and its references. Apart from energy sector, the ever increasing role of AI can also be studied in sectors like agriculture, health care, education.

6 Policy Implication and Suggestions

The sources of energy which are conventional have a massive side-effect on the global climate and climate change. Hence its most desirable to use clean energy which is environment friendly as it has minimum CO_2 contamination and is used to make the world safer and energy proficient (Jha *et al.*,2017).

It is the need of the hour to switch from fossil fuel based energy sources to new carbon free energy sources (Engels *et al.*, 2020). Due to momentum behind clean energy transitions, global demand for coal, oil and natural gas has started to edge downwards to 73% by 2030 as against present trend of 80%. Policies and technologies are available to align energy security and sustainability goals, thereby keeping the door to 1.5^0C open (IEA, 2023). In addition innovative large-scale financing mechanisms are required to support clean energy investments in emerging and developing economies as are measures to ensure an orderly decline in the use of fossil fuels, including coal fired power plants. Actions such as the National Smart and Grid Mission or the smart cities and infrastructure or India Energy Dash Boards should be commenced (Chawla, 2022) The challenges with regard to data collection and communication with energy customers should be suitably resolved with used of AI enabling them to become smart energy users. India should focus on developing AI so that energy is used in an intelligent manner preferring renewable sources of energy (Chawla, 2022). To improve the use of energy resources, interrupted transmission of innovative solutions, poor affordability and climatic concerns, use of innovative solutions and modern technology should be enhanced.

Conclusion

The present paper undertakes a literature review by employing bibliometric analysis to identify significant contributions, themes, concepts and future research from the publications published in the area of AI, sustainability and energy sector. The study is based on the articles being published in Scopus database over a period 2004-2023, i.e for 19 years. The Scopus database was searched using the keyword the "*Artificial Intelligence, Sustainability and Energy*" as a part of a title, abstract, or keyword to compile a bibliography of all manuscript related to this topic of research. Out of the initial search of 938 articles, final articles were limited to 412, after limiting them to English language and document type being article. Our study has used two bibliometric analysis techniques, namely, performance analysis and science mapping (Donthu *et al.*, 2021).Through the performance analysis we found that, 'Quammi', 'Sciale' and 'Kumar' as some of the most influential authors, 'Journal of Cleaner production' and

'Sustainability' as the leading journals in this area. Our study also found out that China is the leading country in this field, followed by USA and India respectively as the most productive countries in producing sustainable, Artificial Intelligence and Energy Sector related literature. The co-citation analysis reveal themes like 'Sustainable development goal', 'Agenda 2030' and 'transforming our world', indicating that various research articles are written around these themes. Co-authorship analysis identifies the most influential author in collaborative efforts, and the most common pattern of collaboration is between researchers from different institutions in the same country, such as China and India followed by collaborations between authors from other countries. Our study revealed that limited collaboration between authors across the different regions also limit the extent of enrichment in this field.

The thematic analysis reveal more centralized and dense themes like decisions support systems reflecting substantial research work in this area. The niche themes generated from the thematic analysis include areas such as efficient energy utilization, decision making systems as the forth coming fields where further research can be undertaken to realize the true applicability of AI technologies in real life scenarios with reference towards sustainability. Our paper has identified that the research in the area of applicability of AI in solving problems of energy sector with sustainable solution is on the rise. As the developed nations, have already severely polluted the world through rapid industrialization, causing increase in emission of greenhouse gases, the development path for developing nations like India cannot be on the same path unless crafted with sustainable means. It is imperative that both developing and developed nations join hands to create more sustainable technology driven solutions.

References

Ahmad, T., Chen, H., Guo, Y., & Wang, J. (2018). A comprehensive overview on the data driven and large scale based approaches for forecasting of building energy demand: A review. *Energy and Buildings*, 165, 301-320.

Aria, M. and Cuccurullo, C. (2017). Bibliometrix: an R-tool for comprehensive science mapping analysis.*Journal of Informetrics*, 11(4), 959-975.

Castriotta, M., Loi, M., Marku, E. and Naitana, L. (2019). What's in a name? Exploring the onceptual structure of emerging organizations. *Scientometrics*, 118(2), 407-437.

Chawla, Y., Shimpo, F., & Sokołowski, M. M. (2022). Artificial intelligence and information management in the energy transition of India: lessons from the global IT heart. *Digital Policy, Regulation and Governance*, 24(1), 17-29.

Cobo, M.J., Lo_pez-Herrera, A.G., Herrera-Viedma, E. and Herrera, F. (2011). An approach for detecting, quantifying, and visualizing the evolution of a research field: a practical application to the fuzzy sets theory field. *Journal of Informetrics*, 5(1), 146-166.

Debnath, K. B., &Mourshed, M. (2018). Forecasting methods in energy planning models. *Renewable and Sustainable Energy Reviews*, 88, 297-325.

Donthu, N., Kumar, S., Mukherjee, D., Pandey, N. and Lim, W.M. (2021). How to conduct a bibliometric analysis: an overview and guidelines. *Journal of Business Research*, 133, 85-296

Engels, A., Kunkis, M., &Altstaedt, S. (2020). A new energy world in the making: Imaginary business futures in a dramatically changing world of decarbonized energy production. *Energy Research & Social Science*, 60, 101321.

Entezari, A., Aslani, A., Zahedi, R., &Noorollahi, Y. (2023). Artificial intelligence andmachine learning in energy systems: A bibliographic perspective. *Energy StrategyReviews*, 45, 101017.

Falagas, M.E., Pitsouni, E.I., Malietzis, G.A. and Pappas, G. (2008). Comparison of PubMed, Scopus, Web of Science, and Google Scholar: strengths and weaknesses. *The FASEB Journal*, 22(2), 338-342.

IEA (2023), *World Energy Outlook 2023*, IEA, Paris https://www.iea.org/reports/world-energy-outlook-2023

Ingale, K.K. and Paluri, R.A. (2022). Financial literacy and financial behaviour: a bibliometric analysis. *Review of Behavioral Finance*,14(1),130-154.

Jha, S. K., Bilalovic, J., Jha, A., Patel, N., & Zhang, H. (2017). Renewable energy: Present research and future scope of Artificial Intelligence. *Renewable and Sustainable Energy Reviews*, 77, 297-317.

Kong, W., Dong, Z. Y., Hill, D. J., Luo, F., & Xu, Y. (2017). Short-term residential loadorecasting based on resident behaviour learning. *IEEE Transactions on power systems*, 33(1), 1087-1088.

Kow, K. W., Wong, Y. W., Rajkumar, R. K., &Rajkumar, R. K. (2016). A review onperformance of artificial intelligence and conventional method in mitigating PV grid-

tied related power quality events. *Renewable and Sustainable Energy Reviews*, 56, 334-346.

Kumar, S., Lim, W.M., Pandey, N. and Christopher Westland, J. (2021). 20 years of electronic commerce research. *Electronic Commerce Research*, 21(1),1-40.

Makala, B., &amp; Bakovic, T. (2020). Artificial intelligence in the power sector. IFC, a member of the World Bank Group, Note 81, 1-8

Mishra, M., Sudarsan, D., Santos, C.A.G., Mishra, S.K., Kar, D., Baral, K. and Pattnaik, N. (2021). An overview of research on natural resources and indigenous communities: a bibliometric analysis based on Scopus database (1979–2020). *Environmental Monitoring and Assessment*, 193 (2).

Monfared M, Rastegar H, Kojabadi HM. (2009).A new strategy for wind speed forecasting

Mongeon, P. and Paul-Hus, A. (2016). The journal coverage of Web of Science and Scopus: a comparative analysis. *Scientometrics*, 106(1), 213-228.

Ranaweera, D. K., Karady, G. G., & Farmer, R. G. (1997). Economic impact analysis ofload forecasting. *IEEE Transactions on Power Systems*, 12(3), 1388-1392.

Ren, Y., Suganthan, P. N., & Srikanth, N. (2014). A comparative study of empirical mode decomposition-based short-term wind speed forecasting methods. *IEEE Transactions on Sustainable Energy*, 6(1), 236-244.

Rodríguez, F., Fleetwood, A., Galarza, A., Fontán, L., 2018. Predicting solar energy generation through artificial neural networks using weather forecasts for microgrid control. *Renew Energy* 126, 855–864.

Rossetto, D.E., Bernardes, R.C., Borini, F.M. and Gattaz, C.C. (2018). Structure and evolution of innovation research in the last 60 years: review and future trends in the field of business through the citations and co-citations analysis.*Scientometrics*, 115(3),1329-1363.

Tunger, D. and Eulerich, M. (2018).Bibliometric analysis of corporate governance research in German- speaking countries: applying bibliometrics to business research using a custom-made database. *Scientometrics*, 117(3), 2041-2059.

using artificial intelligent methods. *Renew Energy*, 34(3),845–8.

Van Eck, N.J. and Waltman, L. (2010). Software survey: VOSviewer, a computer program for bibliometric mapping. *Scientometrics*, 84(2),523-538.

Wilczewski, M., &Alon, I. (2023). Language and communication in international students' adaptation: a bibliometric and content analysis review. *Higher Education*, *85*(6), 1235-1256.

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

FINANCIAL SOCIALIZATION: A SYSTEMATIC REVIEW USING NVIVO

Shilpa Narang*, Prof. Mukesh Kumar Jain**, Kajal Sain***, Abhinash Kumar****

* Ph.D Research Scholar, Department of Commerce, M.M.H. College, Ghaziabad, U.P.

(Affiliated to C.C.S University), Meerut,

Assistant Professor, Jagannath Community College (JIMS-JCC, Rohini)

** Dean and Research Convenor, Faculty of Commerce & Business Administration, C.C.S University, Meerut,

Professor, Dept. of Commerce, M.M.H. College, Ghaziabad, U.P.

*** Department of Management, DIHE

**** Department of Management, DIHE

E-mail: shilpanarang024@gmail.com

mkj.1962@gmail.com

Abstract

Financial socialization is even more important in today's world, which is marked by fast technology breakthroughs, globalization, and increased financial complexity. Financial socialization is important because it provides individuals with the information, skills, and attitudes required to make sound financial decisions. Nowadays, it is explicitly observable that financial socialisation instils good financial conduct, encouraging financial independence and stability throughout life. Budgeting, saving, investing, and debt management are all taught to people by their families, schools, and society. Effective financial socialization promotes economic stability, resilience, and the capacity to manage complicated financial institutions, eventually benefiting both personal and society well-being. This paper aims to figure out all relevant factors that determine financial socialization, with an extensive search of review of literature. A systematic review methodology was applied to examine the literature on financial well-being using the Scopus Database, which included 45 studies. The findings revealed the significant facets or attributes of financial socialization. With the application of NVivo, extensive literature review of forty-five related financial socialization research papers, findings as various dimensions of financial socialization experienced by individuals across different stages of life are examined and understood with the application of visualization analysis- Word cloud, Tree map and Cluster analysis. Based on these findings, this review proposed a need for identifying future prospects and intervening mechanisms for financial socialization.

Keywords: Financial Socialization, NVivo, Qualitative analysis

1. INTRODUCTION

In today's environment, where financial choices are becoming more and more thoughtful and complex, the relevance of financial socialization cannot be ignored.

People have a lot of financial options and challenges because of the quick changes in the economic landscape, technology improvements, and changing financial products and services.

Financial socialization serves as a cornerstone in shaping an individual's financial wellbeing. People are first exposed to different financial conventions, attitudes, and behaviours in their social surroundings as early as childhood. These effects mostly come from family, school, and society. (Solheim, C. A. (2011)). Better financial decision-making abilities and habits might develop later in life as a result of positive financial socialization experiences, such as learning about investing, saving, and budgeting. On the other hand, poor financial socialization experiences, such ignorance of financial matters or seeing careless financial practices, might impede one's capacity towards finance management by fostering unfavorable financial behaviors, financial practices and mindsets. Therefore, an individual's financial attitudes, habits, and eventually their overall financial health and wellness are greatly influenced by the financial socialization they receive.

1.1 Significance of Financial Socialization

- Financial socialization lays the framework for the acquisition of the information and abilities required to sketch prominent and unbiased financial decisions. People acquire vital skills for navigating the challenging financial landscape by learning about budgeting, saving, investing, and managing debt within their social context. (Sorgente, A. et. al (2023))

- Throughout life, people's financial behaviors are significantly influenced by the attitudes, values, and behaviors they encounter in society and learn from it. While negative financial socialization experiences can reinforce harmful behaviors like overspending or ignoring financial planning, positive financial socialization experiences can foster healthy financial habits. (Ameliawati, M., & Setiyani, R. (2018)).

- By enabling people to opt for true and fair financial decisions so as to be consistent with their objectives and values, effective financial socialization enhances people's financial wellness. Consequently, there may be an increase in general quality of life, decreased financial stress, and more financial security. Families, peer groups, and educational institutions are some of the social contexts in which financial socialization takes place. These exchanges affect how people manage their financial relationships with others, including budgeting with a spouse or having open discussions about money in families, as well as how they view money.

- Effective financial socialization improves economic stability and resilience, which benefits societies. People who possess financial knowledge and abilities are better able to withstand economic downturns, promote economic expansion, and engage effectively in the financial system.

- By guaranteeing that people from a variety of backgrounds have easy reachability to financial resources and education, financial socialization is essential to the elevation of financial inclusion. Socialization initiatives have the potential to lessen income and opportunity gaps by providing underprivileged communities with financial literacy.

- The need of financial socialization is further highlighted in today's continuously changing financial environment, which is marked by complicated financial products and technology breakthroughs. People always need to adjust to new financial possibilities and problems; good socialization gives them the tools they need to deal with these changes.

2. *LITERATURE REVIEW*

Swacha-Lech, M., & Swacha, M. (2025) investigated whether pocket money is a regularly used tool for youngsters in Poland to learn about money management. The primary techniques employed in this work were the descriptive method, the CART algorithm, the CAWI survey conducted among 1100 Poles, and a review and critical analysis of the relevant literature. The CART model's results demonstrated that specific characteristics of pocket money systems parents employed when growing up children had an effect on adults' saving habits, but only in terms of the quantity saved—propensity to save is unaffected.

Marchyta, N. K., & Kusumawardhani, A. (2024) stated the effects of financial socialization and literacy on financial well-being with an ascertainment of financial behavior university students on Java Island. A positive relationship amongst financial well-being and financial literacy and socialization was observed in the study.

Utami, P. P. & et al. (2024) determined the adoption of SAK EMKM in Siak Regency is influenced by the preparedness of MSMEs (micro, small, and medium-sized enterprises), the competency of human resources, and the socialization of financial accounting standards for MSMEs. The findings indicated that implementation of SAK EMKM was significantly influenced by human resources and MSME participants' readiness.

Acharya, P., & Poudel, O. (2023) determined how young adults' financial well-being is impacted by their financial behavior and socializing. The high influence of financial behavior and financial socialization amongst young adults was identified.

Ariati, Y. & et. al (2023) found how college student athletes' financial well-being is affected by financial literacy and family financial socialization. Financial literacy has a significant indirect impact on financial well-being through financial self-efficacy, i.e., it does not directly affect financial well-being. A number of stakeholders, including the government, legislators, the sports media, and financial institutions, are anticipated to highlight the importance of advancing practices and regulations that can enhance athletes' financial security as an effect of this research.

Ndou, A. (2023) stated that culture has grown to be a significant part of parental financial socialization in rural and low-income communities worldwide. The evaluation of parental financial behavior, financial monitoring, financial discussion, financial communication, and financial education is used to gauge parental financial socialization. The findings indicated that there is a negative correlation between culture and parental financial socialization. Therefore, parental financial socialization is less common among parents that preserve cultural norms. In light of the findings, this study offers crucial suggestions to the government, financial educators, and parents in order to enhance parental financial socialization.

Pak, T. Y. & et. al (2023) highlighted that variables Financial aptitude and financial socialization from watching parental financial behavior were found to be favorably connected to young adults'

financial well-being. This study investigates the relationship between early adult financial well-being and agent's financial socialization.

Sharma, S., & Agarwal, (2023) conducted bibliometric research on financial socialization. The results included 197 documents from 2003 to 2022. Financial socialization literature is dominated by American regions.

Sorgente, A. & et al. (2023) identified two components of financial capability that are the subject of the current study are financial self-efficacy and financial behavior, wherein, further research is necessary to monitor the developmental trajectories of financial capability and the interactions between the twofold components of financial capability development.

Anthony, M. & et. al. (2022) evaluated the impact of financial socialization on well-being and financial behavior. It also examined how young adults' gender affects how financial behavior affects their financial well-being.

Loke,Y. J. (2022) investigated how financial socialization activities within the family and other socioeconomic factors relate to how much financial autonomy parents give their kids when it comes to pocket money and gift money. The findings demonstrated how important it is for family financial socialization activities to support experiential learning and raise kids' financial literacy, such as having financial discussions and acting as role models.

Nazari, M. S. & et. al. (2022) showed that financial socialization significantly and favorably affects financial contentment while significantly and negatively affecting financial dogmatism. Financial socialization's effect on economic satisfaction monetary indoctrination regarding financial dogmatism Examined were the post-effects of financial dogmatism on financial contentment and how financial dogmatism affects the connection between financial satisfaction and financial socialization.

Suka, L. T. R. B. G., Fachrudin, K. A., & Silalahi, A. S (2022) examined the positive impact of financial attitude and, financial socialization agents on the financial behavior of students boarding and studying in Medan, examine, using financial self-efficacy as a moderating variable. Financial conduct is positively and significantly impacted by financial attitude, positively and

significantly impacted by financial self-efficacy, and not significantly impacted by financial socialization agents.

Anthony, M., Sabri & et. al (2021) investigated the vital factors that stimulate financial vulnerability so that decision-makers can address the aforementioned problem. Experts may use the theoretical and practical contributions of this work to acquire meaningful insights into the elements that impact young people' financial vulnerability when establishing strategies to prevent them from progressively moving from a state of lower to higher financial vulnerability.

Harianto, S., & Isbanah, Y. (2021) determined the variables influencing the Sidoarjo community's financial management plans and practices. Lack of influence of financial knowledge, financial attitude, financial self-efficacy, and parental financial socialization on financial management behavior, income and locus of control was observed.

Khawar, S., & Sarwar, A. (2021) stated that no difference in the financial conduct of representatives from different socioeconomic groups is identified. Family and peer financial socialization shows partial mediation between financial behaviour and financial literacy. The study's objectives were to find the linkage between financial literacy and financial and the mediating influence of family financial socialization on this relationship. We can achieve the goal of determining people's financial behavior through both official and informal financial education.

Kübilay, B., & Tunçel, Ö. (2021) found how university students relate to money regarding their socio-economic-demographic traits as well as their family financial socialization levels. A new two-dimensional scale made up of "financial experience and learning" and "money management skills" has also been established for gauging the degree of monetary socialization that university students have with their families.

LeBaron, A. B., & Kelley, H. H. (2021) highlighted family financial socialization theory, after which examined empirical evidence arranged according to family socialization processes and financial socialization results. This study reviewed the literature on financial socialization, with a focus on articles from the Journal of Family and Economic Issues that were published between 2010 and 2019.

Sabri, M. F. & et al. (2021) Financial strain was the only predictor that showed a negative correlation with financial well-being, but financial knowledge, financial socialization, financial conduct, and financial strain were all shown to be significant.

Sirsch, U. & et al. (2020) examined a model of financial socialization for first-year university students that focused on parents as financial socialization agents and students' current financial outcomes. Significant correlations between students' self-perceived financial learning results and the findings were seen (adopting parental role modeling and financial knowledge) and financial behavior control and their recollected socialization experiences.

Ullah, S., & Yusheng, K. (2020) Based on early childhood consumer experiences (ECCE) and financial socialization (FS), the study assessed an empirical model of financial well-being (FWB). Adults' FWB is found to be significantly impacted by ECCE.

Legenzova, R. & et. al (2019) examined the impact of parental financial socialization elements in contemporary society on the level of financial literacy among Lithuanian high school students. Influence on financial socialization in contemporary culture and as how it occurs throughout the life cycle was determined.

Ameliawati, M., & Setiyani, R. (2018) analyzed that financial literacy serves as a mediating variable in the association between financial attitude, financial socialization, and financial experience and financial management behavior.

Glenn, C. E. (2018) identified that college students' financial actions and financial self-efficacy were found to be unaffected by financial education. The greatest predictor of pupils participating in sound financial conduct was financial self-efficacy.

Mohamed, N. A. (2017) A systematic random sample approach was used to extract 391 participants between the ages of 20 and 40 who completed the survey in order to explore the links between Malaysian Young Employees' financial well-being, financial behavior, financial knowledge, and financial socialization. Financial knowledge, financial behavior, and financial well-being were found positively correlated.

Kim, J., & Chatterjee, S. (2013) highlighted using a nationally representative dataset and financial information from young people, The direct relationship between financial socialization throughout childhood and financial behaviors and asset choices of young adults was found. It was shown that different parental socialization styles had different financial results.

Sabri, M. & et. al. (2012) investigated the connections between college students' reported financial well-being, financial socialization, early consumer experience, academic performance, and personal and family origins.

Solheim, C. A. & et. al. (2011) investigated the financial socialization experiences of 217 college students' families. Richer descriptions of the processes of financial socialization than are now available were obtained by identifying themes and sub-themes through the use of a deductive coding and interpretation technique based on existing research.

Fauth, J. (2004) showed that young consumers can look to in an effort to meet their expanding requirements as consumers are covered in this article. He also analyzed as to money availability with ease. The findings examined the bearing of "financial socialization" on the money management skills of youth.

3. OBJECTIVES OF THE STUDY

- To investigate the various dimensions of financial socialization experienced by individuals across different stages of life.
- To explore the future prospects on improvising the financial socialization.

4. RESEARCH METHODOLOGY

The present investigation used a qualitative research design to comprehensively examine the experiences, perceptions, attitudes and personality of individuals about financial socialization. Research papers have been extracted from various crucial and wide databases like Science Direct, SAGE, Emerald, Springer, etc. Forty five research papers and articles have been reviewed. Qualitative approaches are always ideal for gathering an array of viewpoints and thoroughly examining complicated occurrences.

Preliminary literature review analysis was conducted using QSR International's NVivo 12 Plus software. NVivo software enables users to examine many types of data, including PDFs, text documents, audio and video files, databases, spreadsheets, digital pictures, web pages, bibliographical data, and social media. Using a word frequency search query for qualitative analysis improved comprehension of the material. The results from Nvivo 12 Plus are summarized in the next section.

5. FINDINGS AND DISCUSSION

For the analysis and interpretation of extant literature in context to influence of financial socialization, various visualization tools have been used within NVivo. Forty five research papers and articles on financial socialization using NVivo software's work frequency search query. The 100 most recurrently used terminologies and their synonyms, with atleast 5 letters long are extracted and hence, the findings are shown below as Word cloud.

The following table shows the thirty most frequently used words and the number of times they have been used in the literature:

Table 1: Thirty most commonly used words in the literature

Word	Length	Count	Weighted Percentage (%)
financial	9	8728	2.98
socialization	13	2113	0.72
research	8	1543	0.53
journal	7	1527	0.52
study	5	1517	0.52
money	5	1383	0.47
management	10	1373	0.47
behavior	8	1324	0.45
family	6	1248	0.43
students	8	1176	0.40
parents	7	1052	0.36
education	9	998	0.34
knowledge	9	909	0.31
literacy	8	865	0.30

children	8	843	0.29
young	5	831	0.28
social	6	689	0.24
parental	8	674	0.23
economic	8	642	0.22
analysis	8	639	0.22
university	10	635	0.22
international	13	609	0.21
significant	11	603	0.21
https	5	595	0.20
adults	6	587	0.20
level	5	580	0.20
higher	6	578	0.20
financial	8	570	0.19
table	5	563	0.19
factors	7	556	0.19

For convenience the above table shows only 30 most common words and the total number of times they have appeared in literature. This gives an idea of what most authors are talking about in terms of the keywords, thereby, highlighting the importance of words like financial, socialization, research, journal, study, management, behavior, education, literacy, parents and so on.

Based on a thorough examination of the literature on financial socialisation, the following results were drawn.

Figure1: Word Cloud-Top 30 most commly used words in the literature

First, a "text search query" (TSQ) was applied for locating prominent words, phrases or expressions within the sources imported in NVivo. This serves as a valuable final product and a good tool for understanding about the core fact of data. This figure explains that the financial socialization, family, education, students, management and knowledge are the main topics for consideration.

Figure2: Word Cloud of most commonly used words in the literature
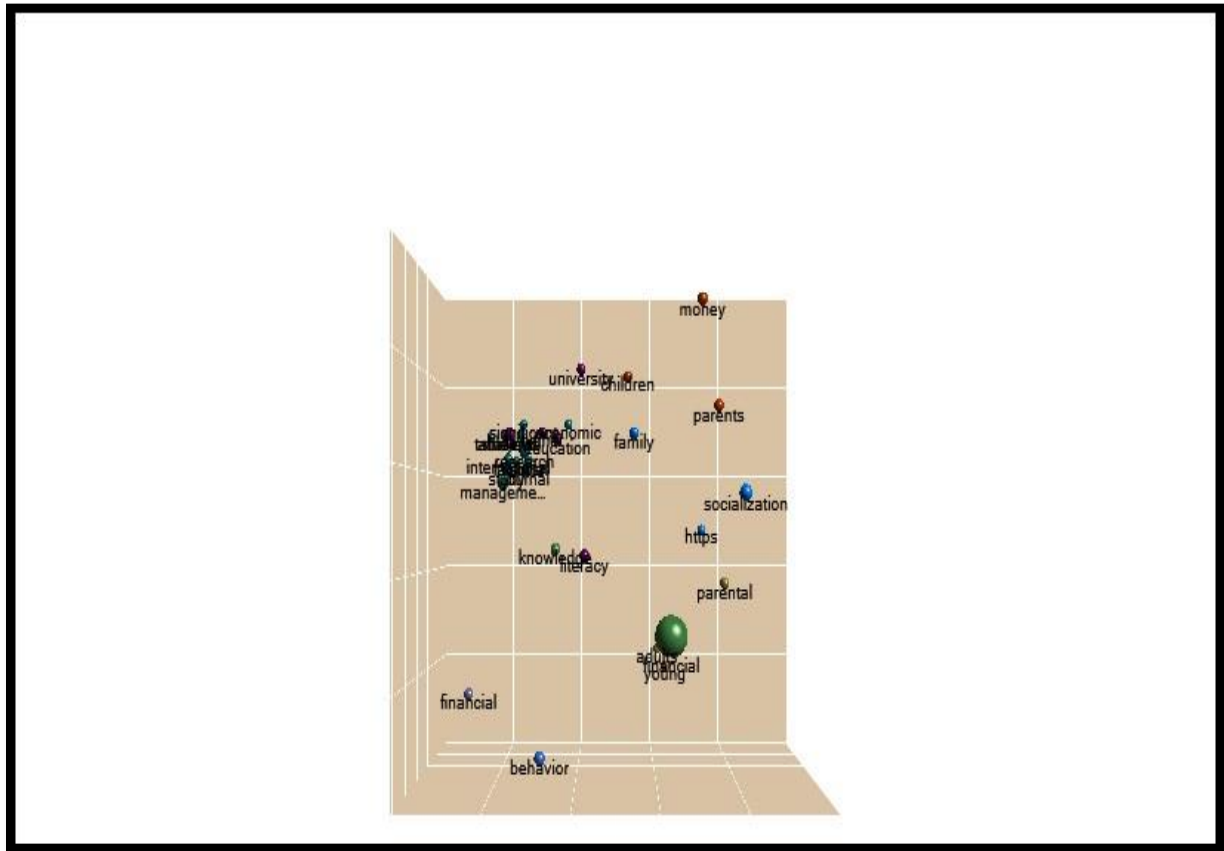
Figure3a: Cluster Analysis Chart (Top 30 words)

The function known as "cluster analysis" was executed. This exploratory tool groups nodes or sources graphically based on any property, word, value, or other similarity that appears to be shared in order to visualize trends in data research. The words used are socialization, parental, behavior, family, universities, children and management.
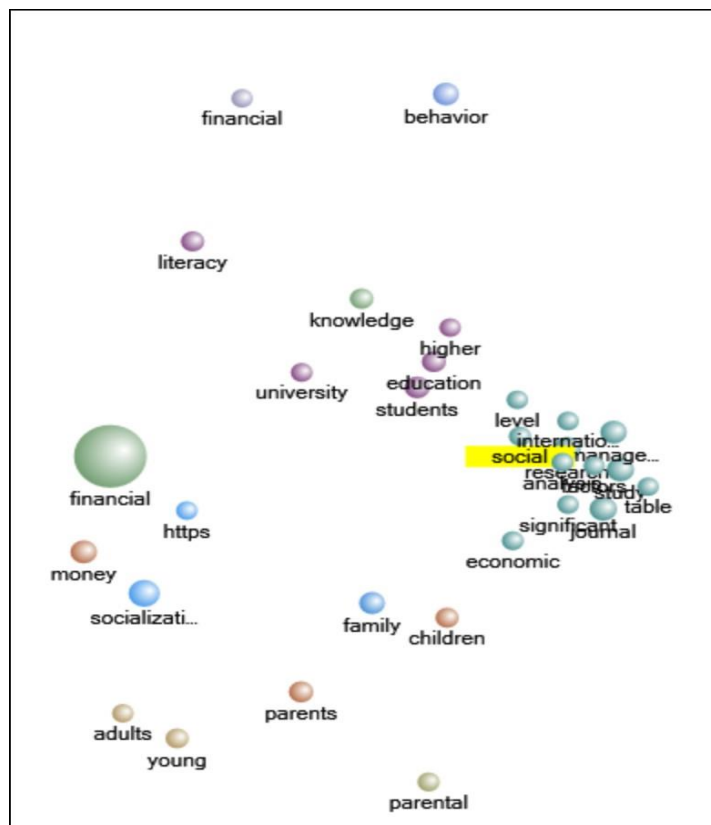
Figure3b: Cluster Analysis Chart (Top 30 words)
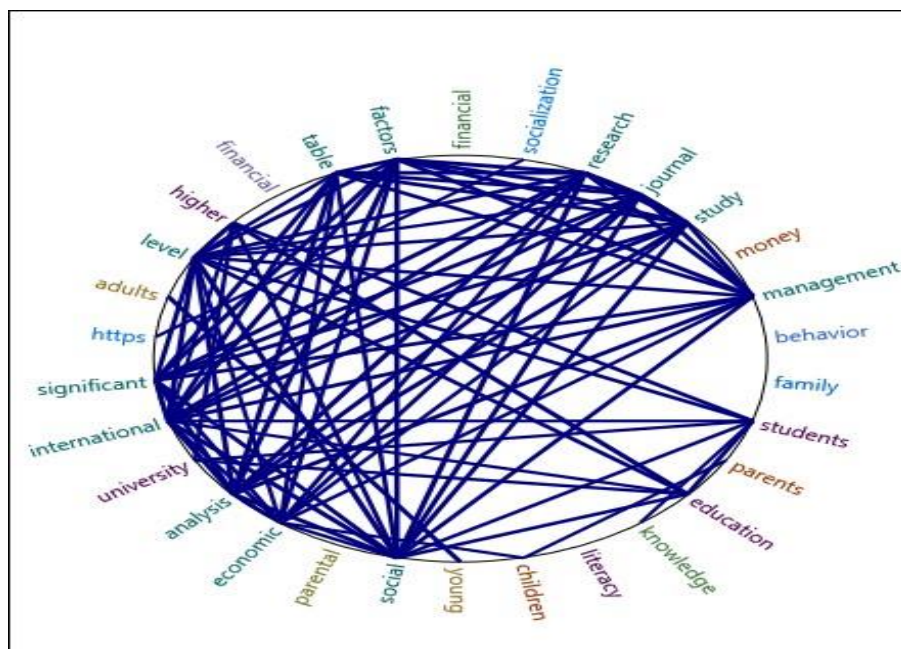
Figure3c: Cluster Analysis Chart (Top 30 words)
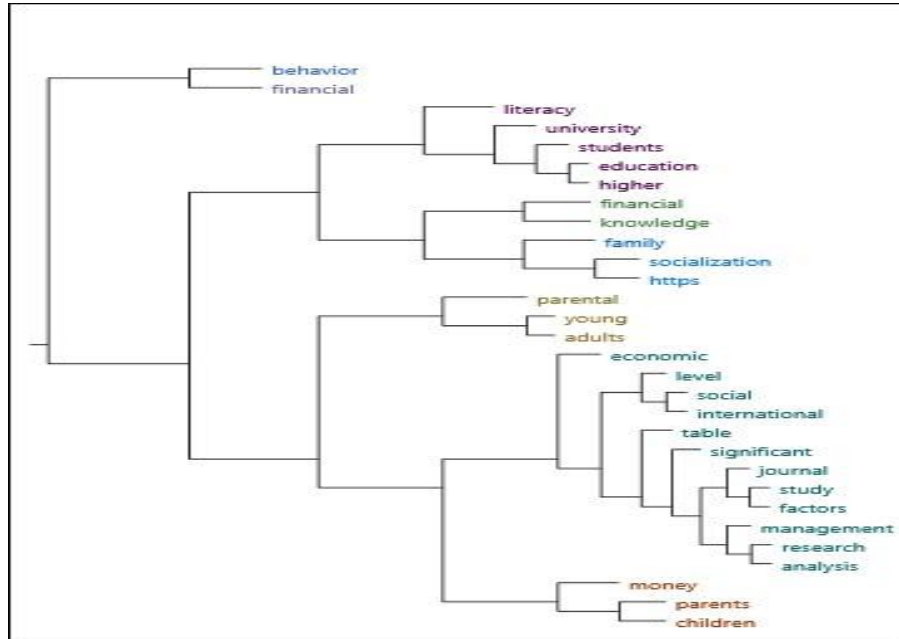
Figure 4: Word Tree

The above word tree shows what different authors are saying or writing frequently about financial behavior, literacy, young adults, knowledge and journal.
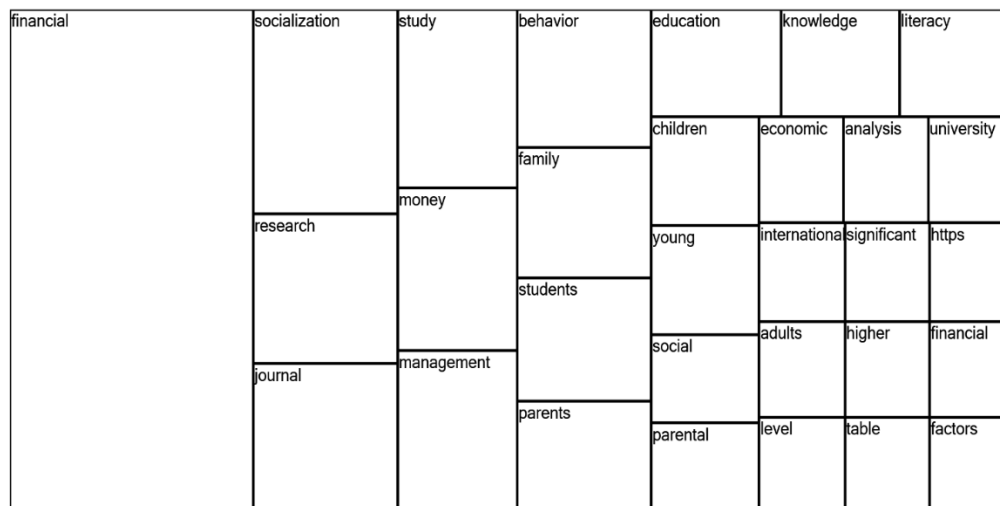
Figure 5: Hierarchy chart (tree map)

A "tree map" is the kind of hierarchy chart that is displayed below. It displays the coding for several articles and authors in the literature and makes it evident which subjects are more and less

significant. As per the box size, this tree map indicates that 'financial' is the highly prominent term followed by 'socialization', 'research', 'behaviour' and so on.

6. FUTURE PROSPECTS

a) **Advanced Educational Initiatives:** Improved financial health across demographics may result from ongoing developments in school programs that emphasize financial knowledge and socializing. Putting in place thorough financial education initiatives in communities, businesses, and educational institutions may provide people with the information and abilities they need to make unfair and unbiased financial decisions for the rest of their life.

b) **Technological Innovations:** Contemporary technologies can improve financial socializing initiatives, including virtual reality and artificial intelligence. Financial education may be made more interesting, accessible, and customized to each person's requirements and preferences with the help of interactive internet platforms, individualized financial coaching apps, and immersive virtual learning experiences.

c) **Inclusive Financial Services:** Enhancing financial health can be achieved through promoting inclusive financial services and products that address a range of needs and situations. Reducing financial exclusion and enhancing general financial health can be accomplished by working to expand underprivileged communities' access to banking, credit, insurance, and investment possibilities.

d) **Behavioral Insights:** Positive financial behaviors and decision-making can be promoted by incorporating behavioral insights into financial socialization programs. People can overcome cognitive biases and develop habits that enhance long-term financial wellbeing with the use of strategies like behavioral design, rewards, and nudges.

e) **Holistic Approaches:** Future initiatives at financial socialization may take a more holistic approach, given the recognition of the interdependence of financial, social, and psychological elements in determining financial wellness. Financial education programs can address underlying barriers to financial health and resilience by incorporating elements like mental health support, social support networks, and mindfulness techniques.

f) **Policy and Advocacy:** A conducive atmosphere for better financial health can be produced by supporting laws that advance financial inclusion, consumer protection, and economic

empowerment. In order to eliminate systemic barriers to financial privacy and security and to promote a more equitable financial system, government initiatives, regulatory reforms, and public-private collaborations can be extremely important.

REFERENCES

Acharya, Pradeep, and Omkar Poudel. "Interplay of Financial Socialization, Financial Behavior, and Adult Financial Well-being." Management Dynamics 26, no. 1 (2023): 33-42.

Ameliawati, Meli, and Rediana Setiyani. "The influence of financial attitude, financial socialization, and financial experience to financial management behavior with financial literacy as the mediation variable." KnE Social Sciences (2018): 811-832.

Anthony, Mervin, Mohamad Fazli Sabri, Husniyah Abdul Rahim, and Mohd Amim Othman. "Financial socialisation and moderation effect of gender in the influence of financial behaviour on financial well-being among young adults." Malaysian Journal of Consumer and Family Economics 28 (2022): 68-99.

Anthony, Mervin, Mohamad Fazli Sabri, Rusitha Wijekoon, Husniyah Abdul, Haslinda Abdullah Rahim, Mohd Amim Othman, and Irwan Syah Md Yusoff. "The influence of financial socialization, financial behavior, locus of control and financial stress on young adults' financial vulnerability." Social Sciences 11, no. 19 (2021): 289-309.

Ariati, Yunita, Agung Dharma Buchdadi, and Etty Gurendrawati. "Financial literacy and family financial socialization: Study of its impact on financial well-being as mediated by financial self-efficacy." The International Journal of Social Sciences World (TIJOSSW) 5, no. 2 (2023): 123-140.

Deter, Max, and André van Hoorn. "Selection, socialization, and risk preferences in the finance industry: Longitudinal evidence for German finance professionals." Journal of Behavioral and Experimental Economics 106 (2023): 102071.

Fauth, Julia. "Money makes the world go around: European youth and financial socialization." International Journal of Human Ecology 5, no. 1 (2004): 23-34.

Glenn, Christina Elaine. The influence of financial socialization on young adults. Kansas State University, 2018.

Harianto, Sustiko, and Yuyun Isbanah. "Peran financial knowledge, pendapatan, locus of control, financial attitude, financial self-efficacy, dan parental financial socialization terhadap financial management behavior masyarakat di kabupaten sidoarjo." Jurnal Ilmu Manajemen 9, no. 1 (2021): 241-252.

Khawar, Sumaira, and Aamir Sarwar. "Financial literacy and financial behavior with the mediating effect of family financial socialization in the financial institutions of Lahore, Pakistan." Future Business Journal 7 (2021): 1-11.

Kim, Jinhee, and Swarn Chatterjee. "Childhood financial socialization and young adults' financial management." Journal of Financial Counseling and Planning 24, no. 1 (2013): 61.

Kübilay, Bilgehan, and Özgür Tunçel. "The Effect of Family Financial Socialization Levels on Money Attitudes of University Students." Süleyman Demirel Üniversitesi Vizyoner Dergisi 12, no. 30 (2021): 393-416.

LeBaron, Ashley B., and Heather H. Kelley. "Financial socialization: A decade in review." Journal of family and economic issues 42, no. Suppl 1 (2021): 195-206.

Legenzova, Renata, Asta Gaigalienė, and Gintarė Leckė. "Impact of parental financial socialization factors on financial literacy of lithuanian high school students." Acta Prosperitatis 10 (2019).

Loke, Yiing Jia. "Family Financial Socialization and Financial Autonomy of Children in Malaysia." Asia-Pacific Social Science Review 22, no. 3 (2022).

Malaviya, Pooja Ravi, and Harsha Jariwala. "Financial socialization: a literature review." prestige International Journal of Management and Research (2019): 176.

Marchyta, Nony Kezia, and Adhityawati Kusumawardhani. "College students financial well-being on java island: the role of financial literacy, financial behavior, and financial

socialization." International Journal of Organizational Behavior and Policy (IJOBP) 3, no. 1 (2024): 27-38.

Mohamed, Nor Azman. "Financial socialization: A cornerstone for young employees' financial well-being." Reports on Economics and Finance 3, no. 1 (2017): 15-35.

Nazari, Mohammad Sajjad, A. H. Taebi, and Hadis Zeinali. "Investigating the effect of financial socialization on financial satisfaction with regard to the mediating role of financial dogmatism." Journal of Accounting Knowledge 13, no. 1 (2022): 141-165.

Ndou, Adam. "The relationship between culture and parental financial socialization." Eurasian Journal of Economics and Finance 11, no. 1 (2023): 41-51.

Pak, Tae-Young, Lu Fan, and Swarn Chatterjee. "Financial socialization and financial well-being in early adulthood: The mediating role of financial capability." Family Relations (2023).

Sabri, Mohamad Fazli, Mervin Anthony, Rusitha Wijekoon, Siti Shazwani Ahmad Suhaimi, H. Abdul Rahim, Amira Shazana Magli, and Muhammad Pisol Mat Isa. "The influence of financial knowledge, financial socialization, financial behaviour, and financial strain on young adults' financial well-being." International Journal of Academic Research in Business and Social Sciences 11, no. 12 (2021): 566-586.

Sabri, M., C. Cook, M. Shelley, T. Hira, S. Garasky, and P. Swanson. "Relation of early childhood consumer experience, financial socialization and financial knowledge with perceived financial." Asia Life Sciences 21, no. 2 (2012): 499-526.

Sabri, M., C. Cook, M. Shelley, T. Hira, S. Garasky, and P. Swanson. "Relation of early childhood consumer experience, financial socialization and financial knowledge with perceived financial." Asia Life Sciences 21, no. 2 (2012): 499-526.

Sharma, Sugandha, and Monika Agarwal. "Impact of Parenting on Financial Socialization: A Bibliometric Analysis."

Sirsch, Ulrike, Maja Zupančič, Mojca Poredoš, Katharina Levec, and Mihaela Friedlmeier. "Does parental financial socialization for emerging adults' matter? The case of Austrian and Slovene first-year university students." Emerging Adulthood 8, no. 6 (2020): 509-520.

Solheim, Catherine A., Virginia S. Zuiker, and Polina Levchenko. "Financial socialization family pathways: Reflections from college students' narratives." Family Science Review 16, no. 2 (2011): 97-112.

Sorgente, Angela, Joyce Serido, Margherita Lanz, and Soyeon Shim. "Family financial socialization during emerging adulthood: Insights from a cross-lagged panel model." Journal of Family Psychology (2023).

Swacha-Lech, Magdalena, and Magdalena Swacha. "Pocket Money as One of the Instruments Used to Shape Children's financial attitude and savings behaviors." Vision (2025): 12784-12805.

Ullah, Saif, and Kong Yusheng. "Financial socialization, childhood experiences and financial well-being: The mediating role of locus of control." Frontiers in Psychology 11 (2020): 570767.

Utami, Putri Prameswari, Novita Indrawati, and Rofika Rofika. "Human resource competencies, socialization, and readiness of msme actors on the implementation of financial accounting standards for micro, small and medium entities." In Riau International Conference on Economics, Business and Accounting, vol. 1, no. 2, July, Realesed on Januari, pp. 457-468. 2024.

INDIAN FOOD PROCESSING INDUSTRY: AN ANALYSIS OF OPPORTUNITIES AND CHALLENGES IN THE CURRENT SCENARIO

Dr. Jai Ram Meena*, Dr. Sonika Sharma**

*Associate Professor, Department of Economics,

Shaheed Bhagat Singh College (University of Delhi), New Delhi (India).

**Associate Professor, Department of Commerce,

Shaheed Bhagat Singh College (University of Delhi), New Delhi (India).

E-mail : jrmeenasbscdu@gmail.com

sonikasharma74@gmail.com

Mobile No.: 9999107959

9868911743

ABSTRACT

This paper is a comprehensive exploration of the opportunities and challenges facing the Indian food processing industry. In today's globalizing food systems, India's food processing industry has significant potential for growth and development due to increasing incomes, urbanization and evolving consumer tastes. Furthermore, the industry benefits from a huge domestic market, agricultural diversification and government policy support. Despite these advantages, the industry has challenges such as the slow rate of transformation, a large unorganized sector, skill gaps and regional disparities, etc. Additionally, global food safety and environmental standards are posing challenges for India's processed food exports. The industry's complex and heterogeneous structure includes coexisting formal and informal, small and large, high and low value-added, export-oriented and non-export-oriented segments, each with its own technological, output, and employment characteristics. Understanding these opportunities and challenges is crucial for designing effective policies to support the industry's growth and development.

Keywords: Challenges, food, opportunities, processing industry.

I. INTRODUCTION

Food processing involves the intentional transformation of any agriculture, animal husbandry and marine food products from its raw or natural state into a consumable or more durable form of food. In the age of globalization, food processing has become instrumental in global food trade, food security and thereby, in transformation towards global development, health and sustainability goals (FAO, 2023). The Indian food processing industry (IFPI) is an important segment of the Indian manufacturing sector that can be introduced in terms of its product scope and significance. Its product scope covers manufactured and value-added food products. In the Indian economy, its significance may be highlighted in terms of quantitative and literary information available on processed food output, consumption demand, exports, investment, scope of growth, etc. In terms of output, consumption and exports, it is the 5th largest industry of the Indian economy. It registered 8.4 per cent average annual growth rate during the last 5 years ending 2020–21. As far as its organized sector is concerned, it, having 41913firms contributed approximately 6.9, 11, 6.9 and 15.9 per cent of output (value-added), total employment, total fixed assets and total number of firms of the Indian organised manufacturing sector, respectively (ASI, 2021–22). It shared 11.57 and 10.54 per cent of agricultural and manufacturing GDP, respectively, in 2020–21 (MoSPI, 2022–23). It shared 2.48 per cent of the world's processed food exports in 2021, 10.5 per cent of India's total exports and 25.6 per cent of agri-exports in 2022-23. It shared 32 per cent of India's food market.It ranked 15th in the Indian industrial sectors in terms of cumulative foreign direct investment inflows (USD 6.19 billion) between April 2014 and March 2023. Recently released, the Household Consumption Expenditure Survey for 2022-23 (HCES, 2022-23) revealed that urban households in India spent 10.5 per cent of their monthly per capita consumption expenditure on processed food and beverages, while rural households spent 9.4 per cent. In the context of 2023 being designated as the International Year of Millets, leading supplier of raw material, increasing demand for branded food, 100 per cent tax exemption, emerging start-ups/entrepreneurs, rapidly moving towards being the 3rd largest economy of the world, etc. also, it is considered a significant industry. This industry has government support in terms of supportive policy environment, tax and other reforms.

Further, the significance of IFPI may be understood well with the support of the research works in the context of the strong connections and interactions food processing promotes between agriculture, industry and rural development. It is a significant industry in terms of its backward linkages with agriculture and structural change bonus to agriculture (Lewis, 1954; Fei and Renis, 1964; Hirschman's linkages hypothesis, 1958), crop diversification and commercialization of agriculture (Sharama and Bathla, 2012), linkages between two pillars of the economy, i.e., industry and agriculture (Iliyas and Goyal, 2007; Hyder and Bhargava, 2016), backward and forward linkages (Khosla, 2019), the bond between food processing, agricultural growth and market competition (Kalirajan and Bhide, 2007), its growth potential due to changing consumption patterns (Pingali and Khjawa, 2004; Dev and Rao, 2004; HCES, 2022-23), urbanization induced diet diversification, towards consumption of dairy, fish, meat, vegetables, fruits, and legumes– foods (FAO, 2023), structural changes in agricultural exports by developing economies (Wilkinson, 2004), variability between regions in dietary patterns (Green et al., 2016), and the recognition of 2023 as the International Year of Millets. Also, IFPI is important and prospective industry in terms of handling developmental concerns such as critical issues of disguised rural unemployment in agriculture, rural poverty, food security, food inflation, prevention of food wastage and providing improved nutritious food to the masses. However, it is an important industry for the growth and development of the Indian economy (Economic Survey, 2022-23) and considered a sun-rising industry of the Indian economy today.

Keeping in view the importance and prospects of this industry in India, this study is set to analyze the challenges and opportunities facing this industry in the current economic environment. It is expected to provide us with a set of useful information for having a closer insight into the industry to suggest the way forward for its faster growth and development in the future. For meeting the objectives of the study, this study is composed of four sections. Section one above introduces the industry. Section two presents the methodology and data used for the study. Section three, the core section of the study, explores the opportunities and challenges facing this industry. The last section concludes the study.

II.   METHODOLOGY AND DATA

This paper makes use of secondary data collected from the Annual Survey of Industries (ASI) 2021–22, which is published by the Central Statistical Organization, Ministry of Statistical & Programme Implementation, Government of India, New Delhi. ASI has been the main source of industrial statistics in India of the organized manufacturing sector on the annual frequency at 2-digit, 3-digit, 4-digit and 5-digit (Unit-level) product classification of industries since 1959. Also, the study uses data on foreign direct investment inflows of the food processing industry, processed food exports, post-harvesting losses, etc., which have been sourced from various annual reports of different ministries and departments of the Government of India, such as the Ministry of Food Processing Industries, NABCONS (a subsidiary of NABARD), Ministry of Commerce and Industry, Department of Promotion of Industry and Internal Trade (DPIIT), India Brand Equity Foundation (IBEF), Statistics Times, Agricultural and Processed Food Products Export Development Authority (APEDA), Household Consumption Expenditure Survey, 2022-23, etc. With this data set, a descriptive methodology has been used to explore the opportunities and challenges of this industry.

III.   AN ANALYSIS OF OPPORTUNITIES AND CHALLENGES

(A)   OPPORTUNITIES

The opportunities before any industry relate to the external factors prospective to its growth and development. IFPI has tremendous opportunities in terms of diversifying agriculture, a huge gap between production and processing rates, rising income and changing food preferences, international convergence of tastes, expanding the avenues to the export of processed foods, untapped rural markets, priority sector status by the government and more. A summary analysis of these opportunities is presented below.

The principal source of raw materials for IFPI is agriculture; therefore, it has strong backward linkages with agriculture. The share of expenses incurred on the purchase of raw materials, primarily sourced from the agricultural sector, is around 85 per cent or more of its total outlay (Ali et al., 2009). The Indian economy has always been agrarian in nature and is now experiencing diversification across and within crop, livestock, forestry and fishery segments.

Within the agricultural sector, the output and employment share of the non-crop sub-sectors is gradually increasing. However, diversification in Indian agriculture is taking place in terms of shifting away from crop production to other agricultural activities (Singh et al., 2006). Diversification and changing cropping patterns in the Indian agriculture offer an opportunity to food processors to get diversified raw materials at low prices. The availability of raw materials at low prices reduces the cost of food processing, which increases the profitability of food processing firms. Consequently, food processing firms invest more in technological upgradation and processing activities, such as cleaning, shorting, grading and cutting, which enhance their efficiency, productivity and output growth.

The size of domestic demand for any product is shaped by the size of the population and its choice and preferences. India, being the most populated country in the world, has a substantial number of consumers who have different sets of choices and preferences for processed food items. The demographic characteristics of India are favourable to the demand side of the processed food products market. India has more than 1.42 billion population, increasing at 1.1 per cent, of which 50 per cent are people below 25 years. This age segment of the population is the main source of demand for processed food items in India. Furthermore, private final consumption expenditure on food items constitutes a sizeable portion of India's GDP. However, India's demographic profile has opened the window of opportunity for the growth of IFPI.

The difference between the production of raw materials and their processing rates is an opportunity as well as a challenge to IFPI. A recent study by Deloitte (July 2021), commissioned by the Ministry of Food Processing Industries (GOI), estimated that the levels of processing of agricultural commodities in India have been low. For 2018–19, the extent of processing was 68 per cent, 3.3 per cent, 11.6 per cent, 34.2 per cent, 15.4 per cent, 21.1 per cent for food grains, fruits and vegetables, poultry, meat, fish, milk, respectively. It has also been low as compared to other countries. This report provides data on the global comparison of India in the context of processing levels (Table 1).

Table 1. Global Comparison of Food Processing Levels (2018-19)						
Commodity	**India**	**USA**	**China**	**Brazil**	**Thailand**	**Italy**
Paddy	92	...	88	95	93	85
Wheat	78	33	41	88	69	...
Oilseeds	49	46	72	...	54	84
Fruit	4	20	7	38	46	42
Vegetables	3	11	3	...	32	38
Meat	34	87	...	56	14	55
Milk	21	65	...	28	29	89
Source: *NABCONS, 2022*						

Table 1 provides an optimistic view for Indian food processors where, except for fruits, vegetables and milk products, India is in a satisfactory position. In case of paddy processing, India was in a highly satisfactory position. This data implicitly shows that India can improve its processing levels internationally. This indicates that India has both the capability and the scope of increasing the processing level, which would support the growth and development of this industry and other associated economic sectors, especially the agricultural sector.

In the context of globalization and economic development, consumers, even in rural areas, are exposed to new food items. The choices between global versus traditional (local) food items are shifting towards global and processed food products. Since the globalization of the Indian economy in 1991, India is experiencing dramatic changes in consumers' food preferences induced by rising incomes, changing lifestyles, the changing nature of jobs, nuclear families, etc. Pingali and Khjawa (2004) found that the food demand in India is transforming due to income-induced diet diversification and diet globalization. Chenggapa et al. (2004) stated that Indian consumers have historically preferred fresh and unpackaged food, but recent changes in consumption patterns show ample opportunities for processed and packed food products, especially amongst middle- and higher-income classes. Ravi and Roy (2006) and Kumar et al. (2007) found that the food consumption pattern is diversifying towards high value-added food products, such as fruits, vegetables, dairy, poultry, fish and processed food. According to the Household Consumption Expenditure Survey (2022-23), the share of expenditure on processed foods and beverages has increased from 9 to 10.5 percent for urban households and from 7.9 to 9.4 percent for rural households, from 2011-12 to 2022-23. This trend indicates that Indian

households are experiencing both Engle's law (1957) and Bennet's law (1959) in their spending patterns. Engle's law states that the proportion of food expenditure decreases as household income increases. Bennet's law explains that as income grows, households diversify their food purchases from staples to include fruits, vegetables, eggs, meat, and other items. These economic laws illustrate the changing share of food expenditure as income grows and the reorganization of the food basket due to increased income. However, India is experiencing the co-applicability of Engel's law and Bennett's law that means rising income levels in India are restructuring the fraction of food expenditure to income and food basket towards processed and value-added food products, respectively, over time. Thus, an income-induced transformation of consumption patterns towards processed and high value-added food products is offering a window of opportunity to this industry to grow fast.

India has several factors that are favourable to the development of the processed food exporting sector. Growing population, urbanization, increasing incomes and changing food preferences are favourable factors for the growth of the domestic processed food market in India, which supports the perspective of Jafee and Gordon (1993) that a sizeable domestic market is a precondition of success in the production and export of processed food products. Also, the Indian processed food industry has potential to grow in terms of the conclusions of a pioneer study by UNCTAD (1997) on developing countries, which concluded that the expanding economies of South-East Asia (higher-income developing economies), the transition effect in Eastern Europe and the World Trade Organization (WTO) regulatory and export promotion frameworks are supportive of processed food exports by developing economies. However, Wilkinson (2004) found that processed food exports by developing countries are experiencing structural changes towards non-traditional items, such as fish, seafood, fruits and vegetables. Jongwanich and Ramos (2009) also found that the exports by developing countries are experiencing structural changes from traditional agricultural exports, such as tea and coffee. Suanin (2020) suggests that the coexistence of high-income and low-price elasticities for processed food imports by developed countries creates export opportunities for developing countries like India. However, the domestic demand-driven export potential (Jafee and Gordon, 1993) of India, its geographical proximity to South-East Asian economies, increasing trade flows under the WTO framework

(UNCTAD, 1997) and structural changes in processed food exports (Wilkinson, 2004; Jongwanich and Ramos, 2009) are all favourable factors for processed food exports by India.

As far as the organized sector of the Indian food processing industry is concerned, the fish and fish products (seafood products), meat and meat products and fruits and vegetables segments of IFPI were the most export-intensive segments, exporting 35, 7 and 3 per cent of their ex-factory products and by-products (ASI, 2021–22), respectively. In addition, the government is now supporting export-oriented firms in this industry. However, overall, the Indian organized food processing industry exported only 2 per cent of its output directly in the year 2021–22. The export share of each segment in its output reveals the heterogeneity in their export involvement.

As Weber's theory of industrial location (1909) states, industries are located where the transport cost of raw materials and final products is minimal and the demand for the products is high. As of now, the demand for processed food items is highly concentrated in metro cities, while in the rural sector, it is still low. However, the rural sector has potential for the growth of demand for processed food items, which needs to be explored by food processors and food businesses.

IFPI is a raw materials based industry (Ali et al., 2009). Diverse agro-climatic conditions, large livestock population and plentiful round-the-year supply of raw materials are favourable factors for the processed food industry. India has 127 agro-climatic zones, which support the uninterrupted supply of a variety of raw materials to these industries round the year. This indicates that India has a comparative advantage in the trade of processed foods. The diversified and continuous supply of low-cost raw materials has implications for growth and product diversification in this industry. However, favourable conditions of the raw material supply serve as an opportunity for growth of this industry.

(B) CHALLENGES

This section discusses the challenges facing IFPI, which include external factors that hinder the growth and development of this industry. Suggesting the way out for its speedy growth and development, this section explores the factors that pose challenges to this industry including preference for fresh food, huge informal segment, lack of required skill set, sub-sectoral imbalances, harvest and post-harvest wastage, food quality and environmental regulatory frameworks.

The growth and development of any industry crucially hinges upon the quantity demanded and the structure of demand for its products in the market, and the food processing industry is no exception to this. The quantity and demand structure of the product depend on the choices and preferences of the consumers for the product. Indian food consumption patterns are, without a doubt, shifting towards processed and high value-added food products from traditional foods (HCES, 2022-23), but it still has a long way to go. Chenggapa et al. (2004) stated that Indian consumers historically prefer fresh and unpackaged foods, whereas Ali (2007) stated that the demand for meat products in India is affected by religious beliefs. For example, the majority of the Indian population consists of Hindus, who worship cow. Muslims, who constitute a sizeable population in the country, do not consume pork. These, and more, religious beliefs hinder the growth of the demand for meat and meat products and consequently, the growth of the food processing industry. To clarify, the authors of the present paper respect the beliefs of the people.

The structure of IFPI is dualistic and idiosyncratic owing to the existence of the sizeable organized and unorganized food processing sectors in India. The coexistence of organized and unorganized food processing sectors poses policy-related challenges. The reason is that the nature, size, input requirement and technological profile of food processing units are different in these two sectors. In the organized sector, productivity is higher with a low volume of employment while in the unorganized sector, productivity is lower with a high volume of employment. This coexisting dual system poses challenges before planners and the government.

The characteristics of IFPI in terms of processing and preservation activities differ substantially across its sub-sectors. In fact, IFPI may also be classified as animal-, agro- and plant-based industries, to name a few, which need different kinds of processing and preserving technologies. Their diverse technological requirements require a different kind of skill and expertise. Although there are multiple human resources' development institutions imparting technical and scientific education relating to food processing and preservation, there is still a mismatch between the skill endowments and the skill requirements of the industry. However, special skill development programmes need to be designed to connect the academia and the industry to narrow down the skill gaps in the food processing sector. Many small and medium food processing units operate as SMEs, leading to a lack of resources for advanced infrastructure and technology upgrades.

FPI is characterized by a multitude of small-scale, non-integrated, and heterogeneous product firms, causing an imbalance in the planning, growth, and development of this industry. A comparison of the percentage share of sub-industries in terms of firms (Table 2) shows that the industry is dominated by a few sub-industries. They use outdated technology and thereby, remain noncompetitive in the world market. For example, grain milling (46.9 per cent), other products (18.6 per cent), edible oils (6.7 per cent), beverages (5.4 per cent) and dairy products (5.2 per cent) constitute 82.8 per cent of food processing firms of India's organized-sector food processing industry (ASI, 2021-22).

This heterogeneity in size shows the possibility of the presence of increasing, constant and negative returns to scale in the industry. Non-constant returns to scale implicitly exposes the possibility of underutilization and/or overutilization of resources in the industry. In different words, non-constant returns to scale imply sub-optimal production structure of a productive entity.

NIC (2008)	Industry Description	No. of Firms	% Share of total Firms	% Share in Exports
Table 2. Sub-sectoral Distribution of Indian Food Processing Firms and Exports, 2021-22
1010	Meat & meat products	173	0.4	7
1020	Seafood products	681	1.6	35
1030	Fruits & vegetables	1319	3.2	3
1040	Edible oil and fats	2799	6.7	1
1050	Dairy products	2170	5.2	0
1061	Grain mill products	19648	46.9	0
1062	Starch & starch products	567	1.4	1
1071	Bakery products	1849	4.4	1
1072	Sugar	737	1.8	3
1073	Confectionary	773	1.8	0
1074	Other products	7798	18.6	7
1080	Animal feeds	1144	2.7	2
1100	Beverages	2254	5.4	0
Total		41912	100	100

Source: *Author's estimates.*
Note: Here, 0 means sub-sector didn't export or exported less than 1 per cent of industry exports.

As mentioned earlier, agriculture is the main source of raw materials for food processing industries. Therefore, it is significantly impacted by harvesting and post-harvesting losses in agricultural production. In low-income countries, the causes of food losses and waste are mainly linked to financial, managerial, and technical constraints in harvesting techniques, storage and cooling facilities in challenging climatic conditions, infrastructure, packaging, and marketing systems (FAO, 2011). India still has a remarkably high level of harvesting and post-harvesting losses in agricultural production in comparison to developed countries. Studies by the Central Institute of Post-Harvest Engineering & Technology (CIPHET, 2015) and the NABARD Consultancy Services (NABCONS, 2022) estimated quantitative losses in major agricultural products in India. The different stages of losses considered by the studies are harvesting, collection, thrashing, grading/shorting, winnowing/cleaning, drying, packaging, transportation and storage of the commodity.

Although, Indian processed food demand is growing fast in domestic as well as in international markets, under the pressure of consumers' health awareness and public and private concerns over environmental protection multiple provisions of food safety and environmental

standards are posing challenges before this industry. Thereby, market access for the processed food products of developing economies in the international markets in developed countries is hindered. The Food Safety and Standards Authority of India (FSSAI) sets the food safety standards in India. Its tight scrutiny of safe food products makes entry, growth and existence of new players in the market difficult. Consequently, older and larger incumbent food processors take the benefit of this situation and sometimes become rent seekers. In the international market, the WTO Agreement on Sanitary and Phyto-sanitary Measures (SPS) and Codex Alimentarius Commission (CODEX) are food safety standards, while international environmental standards are SPS, Technical Barriers to Trade (TBTs) and International Organization for Standardization (ISO). However, the compliance of these food safety and environmental standards not only reduces the flow of food transactions but also increases the cost to the food processors. Consequently, profitability and investments in the food processing sector are affectedadversely.

IV. CONCLUSIONS

The IFPI is a significant manufacturing sector in terms of output, consumption, employment, and exports. It has strong backward and forward linkages with agriculture and exports, making it a special industry in the Indian economy. Globalization, increasing income, changing food preferences, and a shift towards processed, packaged, ready-to-eat, and functional foods are creating opportunities for this industry. Diversifying agriculture, a large domestic market, an unexplored rural market, export potential, and policy support are also favorable factors. However, the industry faces challenges such as slow changes in food preferences, a significant unorganized sector, skill shortages, size differences, and post-harvest losses. Emerging environmental and food safety standards at national and international levels are also posing challenges for both domestic and export demand for processed foods. To support the growth and development of this industry, coordinated policymaking at central and state levels, an efficient regulatory framework, linking food processors to input sources (farmers), institutional support for agricultural markets, improved access to credit, and export promotion are necessar

REFERENCES

Ali, J., Singh, S.P. and Ekanem, E.P. (2009). Efficiency and Productivity in the Indian Food Processing Industry: Determinants and Policy Implications. International Food and Agribusiness Management Review, 12(1), 43-66.

Ali. J. (2007). Productivity and Efficiency in Indian Meat Processing Industry: A DEA Approach. Indian Journal of Agricultural Economics, Indian Society of Agricultural Economics, 62(4), 1-12.

Annual Report of Ministry of Food Processing Industries (2022-23), GOI, New Delhi.

Annual Survey of Industries (2021-22), Central Statistical Organization, MOSPI, New Delhi.

Central Institute of Post-Harvest Engineering and Technology (CIPHET) (2015), Ludhiana.

Chengappa, P.G. (2004). Emerging Trends in Agro-Processing in India. Indian Journal of Agriculture Economics. Vol. 59, No.1, Jan.-March 2004.

Deloitte (2021). Study to Determine the Level of Food Processing in India. Study Commissioned by the Ministry of Food Processing Industries, Government of India, July 2021. https://www.mofpi.gov.in/sites/default/files/final_report_of_lop_july_2021.pdf

Dev, S. and Rao, N.C. (2004). Food Processing in Andhra Pradesh Opportunities and Challenges. Centre for Economic and Social Studies. Hyderabad. Working Paper No. 57 June 2004.

FAO (2011). Global Food Losses and Food Waste– Extent, Causes and Prevention. Rome

FAO (2023). Urbanization is Transforming Agrifood Systems Across the Rural–Urban Continuum Creating Challenges and Opportunities to Access Affordable Healthy Diets. Agricultural Development Economics Working Paper 23–08.

Fei, John C. H. and Gustav Ranis (1964). Development of the Labor Surplus Economy: Theory and Policy, Homewood, Illinois, Richard A. Irwin, Inc.

GOI (2023) Economic Survey 2022-23. Ministry of Finance, Government of India.

Green, R., Milner, J., Joy, E. J. M., Agrawal, S., & Dangour, A. D. (2016). Dietary Patterns in India: A Systematic Review. In British Journal of Nutrition (Vol. 116, Issue 1, pp. 142–148). Cambridge University Press. https://doi.org/10.1017/S0007114516001598

Hirschman, A. O. (1958). Economic Development. Yale University Press, 1958.

Hyder, S., & Bhargava, P. K. (2016). Indian Food Processing Industry - Opportunities and Challenges. International Journal of Economics and Business Research, 1–10. https://doi.org/10.1504/IJEBR.2016.074422

Illiyas, S.M. & Goyal, R.K. (2007). Post Harvest Management and Value Addition: Prospects and Opportunities. Postharvest Management and Value addition, 16-39.

Jaffee, S., and P. Gordon (1993). Exporting High-Value Food Commodities: Success Stories from Developing Countries. World Bank Discussion Papers 198, World Bank, Washington, DC.

Jongwanich, J. and Nedelyn, M.R. (2009). Determinants of Structural Changes of Food Exports from Developing Countries. Asian Development Bank Economics, Working Paper Series No. 166, 1-43.

Kalirajan, K. and Bhide, S. (2007). Sources of Growth in the Indian Food Processing Sector. The Indian Economic Journal, 76-95.

Khosla, R. (2019). Growth and Productivity of Food Processing Industries in India. The Indian Journal of Industrial Relations, Vol. 55, No. 1, July 2019, pp. 54-66

Kumar, P., & Mruthyunjaya and Pratap S. B. (2007). Changing Consumption Pattern in South Asia, in P.K. Joshi, A. Gulati and Ralph Cummings Jr. (eds), Agricultural Diversification and Smallholders in South Asia, Academic Foundation, New Delhi.

Lewis, W.A. (1954). Economic Development with Unlimited Supplies of Labour. The Manchester School, 22(2), 115-127.

MOSPI (2022-23). Annual Report 2022-23. Ministry of Statistics and Program Implementation, Government of India.

MOSPI (2024). Household Consumption Expenditure Survey, 2023-24. Ministry of Statistical & Programme Implementation, Government of India.

NABCONS (2022). Study to Determine Post-harvest Losses of Agri Produces in India, Ministry of Food Processing Industries, Government of India.

Pingali, P. and Khwaja, Y. (2004). Globalization of Indian Diets and the Transformation of Food Supply Systems. Inaugural Keynote Address 17th Annual Conference Indian Society of Agricultural Marketing Hyderabad, 1-33.

Ravi, C. and D. Roy (2006). Consumption Patterns and Food Demand Projections: A Regional Analysis. Paper Presented at the Workshop Plate to Plough: Agricultural Diversification and its Implications for the Smallholders, organized by the International Food Policy Research Institute, Asia office, New Delhi, and the Institute of Economic Growth, New Delhi.

Sharma, R. K. and Seema Bathla (2012). Research Study on Economic and Social Viability of Agro-Processing Industries in India. African-Asian Rural Development Organization (AARDO).

Singh, N.P., Ranjit, K and Singh, R. P. (2006). Diversification of Indian Agriculture: Composition, Determinants and Trade Implications. Agricultural Economics Research Review Vol. 19 (Conference No.) 2006 pp 23-36.

Suanin, W. (2020). Demand Elasticity of Processed Food Exports from Developing Countries: A Panel Analysis of US Imports. Journal of Agricultural Economics, 72(2), 413–429. https://doi.org/10.1111/1477-9552.12409

UNCTAD (1997). World Investment Report: Transnational Corporations, Market Structure and Competition Policy. United Nations Publication, 1-416.

Wilkinson, S. (2004). Focus group research. In D. Silverman (ed.), Qualitative research: Theory, method, and practice, 177–199). Thousand Oaks, CA: Sage.

THE JOB AND LIFE SATISFACTION RELATIONSHIP

Ms Anuradha Sarin*

*Associate Professor, Department of Commerce, Acharya Narendra Dev College

University of Delhi, Delhi - 110019

E-mail: anuradhasarin@andc.du.ac.in

ABSTRACT

Organisations have always been striving for higher performance from their employees. The early management proponents were influenced primarily by scientific management principles and altogether neglected the human dynamics involved in the process. The famous Hawthorne experiments by Elton Mayo shifted the focus from 'Taylorism' and paved the way for the human relations movement. The decades that followed witnessed burgeoning literature on employee attitudes as a primary variable to influence performance, with job satisfaction and life satisfaction permeating practically most of the research owing to their hypothesised interrelationships to higher performance. The research, though not conclusive either on the relationship or causality between the two variables, the issue thus remains contested.

Building on this, the present paper attempts to examine the available published research in the domain and explore the relationship and causality between the two constructs, supporting it with evidence from the Indian dairy industry. The findings endorse the "top-down" model implying that life satis*faction has a higher influence on job satisfaction.*

INTRODUCTION

Employee motivation has always attracted practitioners and researchers alike, with researchers proposing various models and theories recommending many variables, which presumably might lead to increases in employee motivation. One factor which has always been arguable in the literary domain is job satisfaction, due to its intuitive appeal to influence higher performance, and thus, has been the prime focus of most of the studies. This presumption gained almost instant acceptance as it complemented the values endorsed by the human relations movement. The famous Hawthorne experiments from 1924-1933, set the preamble for future studies on job satisfaction, which was further accelerated by the Human Relations movement. The thirties and forties witnessed a proliferation of studies on job satisfaction owing to its

hypothesised relationship to higher performance (Lawler & Porter, 1967). However, the years that followed witnessed the addition of another variable - life satisfaction, as a crucial variable influencing employee motivation. Work and life have always been presumed to be the two most important domains of an individual's life and hence have attracted researchers' interest in identifying how the two influence each other, unidirectionally or bidirectionally. However, despite the intuitive appeal and brimming empirical evidence, the relationship between the two constructs has always been debatable among researchers. Over the years, experts have proposed diverse arguments on the possible correlation between the two constructs. Years of research, though not conclusive and unanimous, however, had unanimity that there cannot be a simple, all-pervasive answer to the relationship between the two constructs which shall apply to everybody, at all times and under all circumstances. The prime concern thus shifted to ascertain whether these two variables are related to each other or whether the relationship between them is spurious. Additionally, if the empirical evidence displays a positive relationship, then the next question is regarding the causality between the two. However, the vast empirical evidence is inconclusive and thus presents divergent recommendations on causality between job and life satisfaction. It has become more like the causality dilemma *"Which came first, the chicken or the egg*?"

Against this backdrop, the paper is structured into two sections. The first section seeks to comprehend the existing literature on the correlation and causality between job and life satisfaction. The second section seeks to further validate the approaches suggested by the literature with results from a survey on the Indian dairy sector.

REVIEW OF LITERATURE

The literature is loaded to the brim trying to establish causality between job and life satisfaction. However, an adroit analysis reveals that the extant literature on their relationship can be categorised into three distinct approaches: spill-over, compensatory and segmentation. The author attempts to trace theoretical explanations and empirical evidence to support all three approaches.

The **segmentation approach** is based on the presumption that individuals simply perceive jobs to be instrumental in earning a living to support their family and/or as a means to finance their leisure activities which are of real interest to them. Being on the job as an employee is just one

of the roles played by an individual and the moment an individual moves out of his workplace, he gets into another role of a father, son, husband, wife etc. The proponents of this approach thus assume that individuals respond to each role independently and hence there is little or almost negligible effect of the satisfaction derived from one role to influence the satisfaction level of other role/s. Based on this theoretical argument, this approach thus suggests a weak or non-significant relation between job and life satisfaction.

Robert Dubin (1956) supported this approach when he concluded that work and its locale were not central life interests to workers and thus job satisfaction plays an almost negligible role in influencing life satisfaction. A similar conclusion was given by Andrews and Withey (1974) wherein they concluded satisfaction with one's family and non-work activities have the highest relative importance while measuring life satisfaction and hence feelings about one's job had a rather mild impact on their general well-being. The results by Andrews and Withey (1974) found further endorsement in a study by White (1981) specifying that family life, friendships and non-work activities were at an advantage over job satisfaction while predicting life satis-faction. Consistent results were reported by London, Crandall and Seals in 1977, highlighting the importance of non-job variables like satisfaction with family and friends for a holistic life. A study by Weaver in 1978 concluded that for a large majority of employees covered by the study, happiness in life is dependent on happiness from a job as well as happiness derived from other domains in life, thus further endorsing previous research that job satisfaction is not solely responsible to influence the overall happiness of most employees. Similar results were reported in the meta-analysis by Near, Rice & Hunt (1980) wherein they concluded that work/job does not play a very substantial role in enhancing the total life satisfaction of most adults. Their results highlighted that the empirical results for the proposed relationship between the two constructs are not as strong as is presumed theoretically and convincing intuitively.

The empirical work conducted to appraise the causality between job and life satisfaction, though substantial, was primarily based on cross-sectional data, thereby challenging the pre-dictability of a causal relationship. To fill this gap Near conducted a longitudinal study over the period 1972 and 1977, as the use of longitudinal data provides stronger support to establish causal relationships. His study concluded that the presence of job satisfaction at time 1 had no direct influence on life satisfaction at time 2, and the presence of life satisfaction at time 1 had no direct influence on job satisfaction at time 2. However, Near argued that although job and

life satisfaction did not influence each other over two time periods spread over five years, it is not definitive proof to conclude that they do not influence each other. He argued that there is a possibility of the effect getting diluted over a long period of five years, and hence causal relationships could not be identified in the long term. To address this Rode and Near conducted another study in 2005 measuring the effect over three years. The results were, however, the same as in the earlier study by Near measuring causality over five years. The findings given by Near, neither matched the findings given by Orpen (1978) who concluded the causality to flow from JS to LS nor did it match the findings of Schmitt and Mellon (1980) who concluded the causality from life satisfaction to job satisfaction.

An interesting observation was however made by Brayfield and Wells in 1957 when they identified that the causality between the two constructs was influenced by gender. They found no significant relationship between the two variables for women respondents, but for men respondents, the results were strikingly different as job satisfaction played a critical role in predicting their life satisfaction. However, the results were also challenged in later studies by white (1981) and by Kavanagh and Halpern in 1977, as both studies found no significant relationship between the variables across gender.

In its entirety, with sufficient empirical evidence to its credit, the segmentation approach assumes that work/job does not enjoy a supreme status in people's lives and hence satisfaction/dissatisfaction on the job fails to affect satisfaction with life. This approach, thus presumes a sharp segmentation between work and life domains, on the premise that as societies evolved, work is no longer central to people's lives and they choose different hobbies or involve themselves in cultural and social activities which make up for their life satisfaction.

The **compensatory** approach as the name suggests, assumes that either of them – job satisfaction or life satisfaction tries to make up for what is missing in the other, thus signifying a negative relationship between the two variables. This approach is based on the presumption that when individuals have routine and/or boring jobs, they compensate it with challenging activities off the job. If their jobs are too challenging, they would not like to go for challenging off-job activities. They would rather pursue activities which are more comforting and relaxed. Thus, individuals dissatisfied or less satisfied with their jobs are likely to compensate for it by finding enjoyment in other domains of life. Thus, a negative relationship exists between jobs and life. The compensatory model has received an almost negligible response, as the approach

has proved to hold only for jobs with extremely undesirable features. As such, the compensatory model found empirical support in studies involving employees working in highly stressful occupations such as coal mining (Dennis, Henriques and Slaughter,1956) and fishing (Tunstall, 1962). Employees working in such occupations often try to compensate for the stress of the job by involving themselves in leisure activities outside the realm of their jobs to improve their life satisfaction.

The **spillover approach** is undoubtedly the most popular and acceptable amongst academicians and practitioners. This approach presumes that satisfaction/dissatisfaction derived from one domain is likely to spill over to the other domain, and hence there exists a positive relationship between the two constructs. The approach seems theoretically rational as satisfaction in one life domain (job or life) is bound to have implications for other life domains (job or life). Though the empirical evidence is skewed in favour of the spillover approach, however, the conclusions lack unanimity over the direction of causality. A large number of studies argue theoretically and have empirical evidence to endorse that job satisfaction influences life satisfaction, and an equally good number of studies argue that life satisfaction has a potential influence on job satisfaction. Still, another school of thought asserts that the causality is bi-directional, with both of them influencing each other and in turn also getting influenced by each other. To address this lively debate, an analysis of all three approaches thus becomes desirable.

Job satisfaction leads to life satisfaction

Work has always been a means of living and the working population spends most of their waking hours at work (Quinn et al., 2016). Considering the time individuals spend on their jobs, it seems almost impossible to assume that it shall not leave any impact (positive or negative) on their lives. Individuals do carry home the baggage of pleasant or awkward feelings or incidents at work. Job not only provides monetary benefits for subsistence but also bestows intangible gains like security, prestige, confidence, a sense of accomplishment, recognition, honour and dignity, which go a long way in influencing life satisfaction and hence, one can safely endorse the notion that job satisfaction influences life satisfaction.

The initial empirical support for the Spill-over approach came from Kornhauser(1965), who proclaimed that workers who experienced dissatisfaction in their jobs, had reported unhappiness in their personal lives also. They did not report compensating job dissatisfaction by finding

alternate enjoyment in other domains of life, thus suggesting no support for the compensatory hypothesis. The findings of Kornhauser found endorsement from Iris and Barrett (1972), in their study on male supervisors when their results reported that respondents who were high on job satisfaction were also high on life satisfaction and vice versa. Martin Meissner (1971), in his paper titled "*The Long Arm of the Job*", suggested that the burden at work - light or heavy, happy or sad is carried home, thus supporting the spillover approach. An individual spends approximately forty hours every week on the job which is about one-third of his waking hours, so the impact a job has on the worker cannot be easily shaken off on the way back home. Similar results were reported by Rousseau (1978), in a study conducted on employees of an electronic firm and radio station. Rousseau's findings supported the spillover model and reported the causality to flow from job to life. Evans and Bartolome (1980), also supported the causality to flow from job to life. Their results supported the spillover approach and confirmed that the direction of the spill is from job to private life and additionally emphasised that the spill is essentially negative. Their respondents reported that tensions at work are more likely to get spilled over into life. The respondents found it difficult to recollect instances when their personal life had affected their work life, except in extreme cases such as death, divorce or a very serious medical emergency. They, thus endorsed the causality to flow from job to life and not vice-versa.

To find more accurate answers to causality, Orpen conducted a cross-lagged correlational technique in 1978 and obtained data at two-time intervals which were a year apart. The results endorsed the spillover approach and additionally provided empirical evidence on the direction of the spill. The cross-lagged correlation between job satisfaction at Time 1 and non-work/life satisfaction at Time 2 was quite higher as compared to non-work satisfaction at Time 1 and work satisfaction at Time 2, thus, suggesting that work satisfaction has a stronger effect on non-work/life satisfaction. Another such attempt was carried out by Chacko in 1983. Chacko also argued that as the empirical work is primarily based on static correlation, the results obtained cannot provide conclusive evidence of the causality between the two variables. His study went a step ahead of Orpen's work as he collected data over four years as against one year. His conclusions Ls has on JS. To integrate the diverse empirical findings on the suggested relationship between JS and LS in a much more systematic way, Tiat et al., (1989) conducted a meta-analysis of 34 studies. After correcting for all sampling and measurement errors, their results

reported a correlation of 0.44, thus endorsing a strong positive connection between the two variables.

An interesting addition to the extant literature was provided by a large number of studies reporting the conclusions of the spillover approach from job satisfaction to life satisfaction to remain unaffected even when the construct of job satisfaction was segregated into intrinsic and extrinsic job satisfaction. Factors such as pay, prestige, working conditions and the like are responsible for influencing extrinsic job satisfaction whereas the core job itself influences intrinsic job satisfaction. White (1981), concluded that a job which can provide recognition, prestige and higher monetary rewards shall assume higher importance in people's lives and thus has a positive impact in enhancing their overall life satisfaction also, thus supporting the crucial role played by extrinsic factors to enhance life satisfaction. The study reported that intrinsic factors even when rated favourably by employees failed to significantly influence their life satisfaction. Similar results supporting the spillover approach to extrinsic job satisfaction were obtained in a study by Steiner and Truxillo (1987) when they concluded that extrinsic factors related to the job had a direct relationship with life satisfaction whereas the intrinsic factors related to job failed to significantly influence the level of life satisfaction of individual(s) covered under survey. However, it is also suggested that the intrinsic outcomes shall have an impact on life satisfaction only in situations where an individual places high importance on work.

Life satisfaction leads to job satisfaction

Life satisfaction is considered an important and all-pervasive aim of all individuals. Popularly known as the 'top-down model', the approach assumes that life satisfaction leads to job satisfaction. This approach is based on the theoretical argument that an individual with higher life satisfaction is more likely to have a higher positive perception towards his or her career and work as compared to a person with lower life satisfaction. If research reveals a positive answer to this approach, then it will most likely influence the management policies aimed at increasing employee satisfaction and thereby productivity. Employers can reap economic benefits by assisting or supporting employees solve their personal life problems as it shall help improve their job performance.

An obvious logic for this approach is found in the Cognitive Dissonance theory as proposed by Festinger in 1957. The theory argues that individuals have a strong inner drive to have

harmony across distinct life domains. Resultantly, to achieve harmony and/or reduce discord between life domains, individuals satisfied with their life in general also tend to feel/find satisfaction with their jobs as well and vice-versa. The valence-expectancy theory suggested by Hackman and Lawler (1971) also suggests the causality to flow from life satisfaction to job satisfaction. Similar conclusions were reported by Schmitt and Mellon in 1980, in their study involving young, low-level job holders as against managerial or professional jobholders. For this category of the workforce, outside interests and hobbies may be more important and their satisfaction in these domains may get carried over to their jobs, thus supporting life to job satisfaction. Support for the top-down model was also received from the work of Hagmaier, T, et al., (1980), in their longitudinal study concluding that the causal association between the two variables is best represented by the top-down model i.e. life satisfaction leads the way to job satisfaction. The longitudinal study by Judge and Watanabe (1993) also supported the 'top-down' approach, thus clearly revalidating that the impact of life satisfaction in influencing job satisfaction is much greater than the impact of job satisfaction in influencing life satisfaction.

Life satisfaction and job satisfaction are bidirectional

The above two approaches have restricted the relationship between job and life satisfaction to flow one way, from either job-to-life satisfaction or life-to-job satisfaction and have further validated it with empirical evidence supporting either of the notions to hold for the selected sample. This approach, however, offers a much broader perspective arguing that both the variables might be mutually related to each other and hence it is likely that they are interactive, with each possibly affecting the other and in return getting affected by it. Job satisfaction may have a significant influence in enhancing life satisfaction as salary and positional esteem not only contribute to better job satisfaction but also contribute to an enriching life experience. Likewise, life satisfaction, such as marital happiness is likely to positively impact one's job performance. Thus, both variables are mutually interrelated.

The study by Keon and McDonald (1982) provided empirical evidence to support the mutual interdependence between the constructs, arguing that job and life satisfaction are affective spheres of one's life and thus can influence one another. Unanue et al., (2017), endorsed this view as their study also concluded that high job satisfaction positively influences life satisfaction, which in turn positively influences job satisfaction, and vice versa thereby creating a vicious cycle which is beneficial for both, individual and organisational well-being.

The three approaches elucidated above as propounded by Wilensky (1960) are not mutually exclusive and hence it is always possible that all three approaches are present simultaneously in a single work setting. Within the same work context, some workers may respond to a bad work situation by compensating it with better leisure activities whereas another set of workers in an identical situation might produce an opposite spillover effect. Thus, while a dull, repetitive job may stimulate some workers to compensate for it by seeking enjoyable leisure alternatives, the same job might produce habits of passive or negative behaviours back home in other workers. Judge and Watanabe in their longitudinal study in 1994 supported this notion. They argued that the empirical evidence seeks validation for only one approach, totally disregarding the other two. Hence, more detailed research is required before concluding the causality of the relationship between the two constructs, with special emphasis to be given on acknowledging the likelihood of all three approaches coexisting in a particular work set-up.

METHODOLOGY AND ANALYSIS

Sample and data collection

To study the correlation and causality of the proposed relationship between job and life satisfaction, responses were obtained from employees of two leading dairy firms (names kept anonymous) as promised to the HR heads. One of the organisations has its Head office in New Delhi, India, and the other is a market leader in South India having its Head office in Hyderabad. The study covered all employees from junior and middle management across all functional areas. The study strictly adhered to principles of ethical conduct such as voluntary participation, anonymity and confidentiality of the respondents which is essential to ensure factual responses. To ensure mature responses, a minimum of 5 years of total work experience was set as a filter.

In all, 416 valid (217 responses from one organization and 199 from the other organization) responses were obtained from a total target population of 800, thereby indicating a response rate of more than 50%. The average age of respondents varied from 27 to 62 years. Of the total respondents, 92.07 % (N = 383) were male and 7.93 % (N = 33) were female. Age-wise distribution revealed that 26% fell in the age bracket of 25-35 years, 43% belonged to the age bracket of 35-45 years, 25% were in the age group of 45-55 years and only 6% were in the age bracket of 55-65 years. The study used self-reporting to assess their job and life satisfaction. A seven

point Likert rating scale was used (1 = strongly disagree, 2 = disagree, 3 = somewhat disagree, 4 = neutral, 5 = somewhat agree, 6 = agree, 7 = strongly agree).

Measures used

The study used global measures to capture job satisfaction as they allow the respondent to respond from a much broader perspective by not limiting their responses to the facets mentioned in the survey questions. However, multiple questions to measure global job satisfaction were used, as the use of multiple questions enhances the reliability of the instrument. The Job Satisfaction Index (JSI) was developed by Brayfield and Rothe in 1951 and is the most used scale to measure global job satisfaction. The scale has stood the reliability test with a Cronbach Alpha score of .87. Though the original version of the scale has 18 items, the smaller adaptation of the scale with five items is normally used (Judge, Bono and Locke, 2000). A sample question is *"I feel fairly well satisfied with my present job"*.

To measure life satisfaction 'The Satisfaction With Life Scale' (SWLS) was used. SWLS has demonstrated reliable and valid results in previous studies with good psychometric characteristics (Pavot and Diener, 1993). Resultantly, it is widely used to measure an individual's satisfaction with his/her life as a whole. It is a five-item, 7-point Likert scale, wherein all five statements are phrased positively, and the scores can be summed up to arrive at a total score ranging from 5 to 35 (Pavot and Diener, 2007). A sample question is "*In most ways, my life is close to my ideal*".

Results

To ensure that the survey responses have good internal consistency, Cronbach Alpha scores for both domains were determined using IBM SPSS statistics 22. The Cronbach Alpha score stood at 0.845 and 0.838 respectively for job and life satisfaction. As both have an alpha value higher than the acceptable limit of 0.7, it ensures that the data has good internal consistency.

To ascertain the correlation between JS and LS Kendall's tau-b correlation coefficient was calculated. With a positive correlation coefficient of 0.403, at a 5% level of significance, the present survey reveals that both JS and LS have moderate to strong correlations and they move in the same direction. To ascertain the direction of causality, the regression coefficient was calculated. Table 1 depicts the regression coefficient with job satisfaction as the dependent variable.

Table 1: Regression Coefficient of Regression Model of JS on LS

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	8.642	1.210		7.145	.000
	LS	.719	.046	.611	15.701	.000

a. Dependent Variable: JS

The p-value for the LS coefficient is shown as 0.000, indicating a very low p-value (less than 0.001) thereby confirming the statistical significance of the proposed relationship. It suggests that LS as a predictor variable has a significant and positive effect on the dependent variable (JS), thus indicating that as LS increases, JS also tends to increase. The model suggested is as follows:

$$JS = 8.642 + 0.719 * (LS) \tag{1}$$

This regression equation represents the estimated relationship between the dependent variable (JS) and the independent variable (LS), suggesting that for every one-unit increase in LS, JS increases by 0.719 units, keeping other variables constant. The constant term of 8.642 represents the estimated value of JS when LS is zero. Table 2 depicts the regression coefficient with life satisfaction as the dependent variable.

Table 2: Regression Coefficient of Regression model of LS on JS

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	11.763	.923		12.751	.000
	JS	.519	.033	.611	15.701	.000

a. Dependent Variable: LS

the p-value for the JS coefficient is shown as 0.000, indicating a very low p-value (less than 0.001) and thus confirming that the relationship is statistically significant. It suggests that JS as a predictor variable has a significant and positive effect on the dependent variable (LS), thus indicating that as JS increases, LS also tends to increase. The model suggested is as follows:

$$\textbf{LS} = \textbf{11.763} + \textbf{0.519*(JS)} \tag{2}$$

This equation represents the estimated relationship between the dependent variable (LS) and the predictor variable (JS) in the linear regression model. The equation indicates that for every unit increase in JS, the estimated value of LS increases by 0.519 units, with all other variables kept constant. The constant term of 11.763 represents the estimated value of LS when JS is zero.

The results thus help the author conclude that the impact of life satisfaction on job satisfaction is much stronger than the effect job satisfaction has on life satisfaction.

DISCUSSION AND CONCLUSION

Increasing organisational performance by motivating employees to perform to the best of their competency has always been the focus of management practitioners and researchers have followed suit with the intent to provide them with conclusive solutions. Resultantly, job and life satisfaction of employees have always been the most widely researched variables due to their intuitive appeal. This is evident as the literature is loaded with studies trying to establish consensus on the causality between the two variables. Three approaches - segmentation, compensatory and spillover have been theoretically supported and empirically validated by researchers, however, the results are skewed in favour of the spillover approach and also support that the causality runs from job to life satisfaction.

However, the conclusions are conflicting, part of which may be attributable to different samples used across studies and/or using different statistical techniques. However, an adroit literary analysis compels the author to believe that there cannot be a universal model of the said relationship between job and life satisfaction, which applies to everybody, at all times and under all circumstances. A review by Kabanoff (1980) also concluded that the vast empirical literature is not unanimous and thus does not strongly advocate either of the three approaches.

More empirical research on this issue is necessary if the relationships among the work and non-work domains of employees' lives are to be understood.

The present work has focussed on the employees of the Indian dairy sector as this sector has witnessed phenomenal development since the launch of "Operation Flood" by Dr. Verghese Kurien, in 1970. Despite its stellar progress, the dairy sector has received negligible academic attention vis-a-vis research studies related to human resources. The sector has been predominantly unorganised, but the pace with which big organisations are entering this domain also supports the need to have research on their human capital.

The published literature has reported the presence of a significant positive correlation between job and life satisfaction ranging from 0.30 (Near, Rice and Hunt, 1978) to 0.44 (Tait et al., 1989), indicating that the two variables not only share a strong relationship but also move in the same direction. This means that when one increases the other also increases and vice-versa. The results of the present study with a strong positive correlation ($r = .403$) between job and life satisfaction are very much consistent with the literary findings. Having established a positive significant correlation between the variables, regression analysis was conducted to establish a causal relationship between LS and JS. The result supports the '*top-down*' perspective as advocated by Judge and Watanabe in 1993, implying that life satisfaction has a positive significant influence on job satisfaction. Findings such as these validate prior research and have pragmatic implications for management practitioners desirous of increasing their employees' job satisfaction with the intent to improve their performance to also focus on their employees' life satisfaction, as it plays an appreciable role in influencing job satisfaction.

Finally, it would be remiss if the limitations of the study were not mentioned when interpreting the results. The study has used cross-sectional data, hence causality cannot be conclusive. The use of longitudinal data certainly gives better and more accurate results. The author claims causality purely based on theoretical logic which is supported by prior findings. Secondly, the present survey uses self-reported data, which is often accused of leniency, and/or personal bias. Further research including different raters such as supervisors and peers shall provide a fair comparison to arrive at more convincing conclusions. More detailed studies involving moderators and mediating variables shall provide a more elaborate and candid analysis of the stated relationship between the two constructs. A study by Bamudo and Kopelman in 1980 reported that education, income, occupation, gender, and job longevity are a few variables which are

found to often moderate the relationship between job and life satisfaction. Marital status family size, financial strength and individual personality can be a few other potential mediating variables, which may influence the results, hence future studies can include them to have a holistic solution. Besides this, the present work has been undertaken on employees of the dairy sector only, hence more research across different industries, involving a larger sample size is desirable before the results can be generalised.

REFERENCES

Andrews, F. M., & Withey, S. B. (1974). Developing measures of perceived life quality: Results from several national surveys. *Social Indicators Research*, *1*(1), 1-26.

Brayfield, A. H., Wells, R. V., & Strate, M. W. (1957). Interrelationships among measures of job satisfaction and general satisfaction. *Journal of Applied Psychology*, *41*(4), 201.

Chacko, T. I. (1983). Job and life satisfaction: A causal analysis of their relationships. *Academy of Management Journal*, *26*(1), 163-169.

Dennis, N., Henriques, F., & Slaughter, C. (1969). Coal is our life: An analysis of a Yorkshire mining community (Vol. 50). London: Tavistock Publications.

Dubin, R. (1956). Industrial Workers' Worlds: A Study of the" Central Life Interests" of Industrial Workers. *Social Problems*, *3*(3), 131-142.

Evans, P., & Bartolome, F. (1980). The relationship between professional and private life. *Work, Family and Career, Praeger, New York*, 281-317.

Festinger, L. (1957). Social comparison theory. *Selective Exposure Theory*, *16*, 401.

Hackman, J. R., & Lawler, E. E. (1971). Employee reactions to job characteristics. *Journal of applied psychology*, *55*(3), 259.

Hagmaier, T., Abele, A. E., & Goebel, K. (2018). How do career satisfaction and life satisfaction associate?. *Journal of Managerial Psychology*, *33*(2), 142-160.

Iris, B., & Barrett, G. V. (1972). Some relations between job and life satisfaction and job importance. *Journal of applied Psychology*, *56*(4), 301.

Judge, T. A., & Watanabe, S. (1993). Another look at the job satisfaction-life satisfaction relationship. *Journal of applied psychology*, *78*(6), 939.

Kavanagh, M. J., & Halpern, M. (1977). The impact of job level and sex differences on the relationship between life and job satisfaction. *Academy of Management Journal*, *20*(1), 66-73.

Keon, T. L., & McDonald, B. (1982). Job satisfaction and life satisfaction: An empirical evaluation of their interrelationship. *Human Relations*, *35*(3), 167-180.

Kornhauser, A. (1965). Mental health of the industrial worker: A Detroit study.

Meissner, M. (1971). The long arm of the job: A study of work and leisure. *Industrial Relations: A Journal of Economy and Society*, *10*(3), 239-260.

Near, J. P., Rice, R. W., & Hunt, R. G. (1980). The relationship between work and nonwork domains: A review of empirical research. *Academy of management review*, *5*(3), 415-429.

Lawler III, E. E., & Porter, L. W. (1967). Antecedent attitudes of effective managerial performance. *Organizational behavior and human performance*, *2*(2), 122-142.

London, M., Crandall, R., & Seals, G. W. (1977). The contribution of job and leisure satisfaction to quality of life. *Journal of applied psychology*, *62*(3), 328.

Orpen, C. (1978). Work and Nonwork Satisfaction: A Causal-Correlational Analysis. *Journal of Applied Psychology*, *63*(4), 530.

Quinn, B. T., & Strickland II, W. R. (2016). Every waking hour: An introduction to work and vocation for Christians. Lexham Press.

Rode, J. C., & Near, J. P. (2005). Spillover between work attitudes and overall life attitudes: Myth or reality?. *Social Indicators Research*, *70*, 79-109.

Schmitt, N., & Mellon, P. M. (1980). Life and job satisfaction: Is the job central?. *Journal of Vocational Behavior*, *16*(1), 51-58.

Steiner, D. D., & Truxillo, D. M. (1987). Another look at the job satisfaction-life satisfaction relationship: A test of the disaggregation hypothesis. *Journal of Occupational Behaviour*, *8*(1), 71-77.

Tait, M., Padgett, M. Y., & Baldwin, T. T. (1989). Job and life satisfaction: A reevaluation of the strength of the relationship and gender effects as a function of the date of the study. *Journal of applied psychology*, *74*(3), 502.

Tunstall, J. (1962). The fishermen. *(No Title)*.

Unanue, W., Gómez, M. E., Cortez, D., Oyanedel, J. C., & Mendiburo-Seguel, A. (2017). Revisiting the link between job satisfaction and life satisfaction: The role of basic psychological needs. *Frontiers in psychology*, *8*, 239579.

Weaver, C. N. (1978). Job satisfaction as a component of happiness among males and females. *Personnel Psychology*, *31*(4), 831-840.

Wilensky, H. L. (1960). Work, careers and social integration. *International social science journal*.

White, T. H. (1981). The relative importance of work as a factor in life satisfaction. *Relations industrielles*, *36*(1), 179-191..

BRIDGING GAPS: AI'S ROLE IN ADVANCING EDUCATIONAL EQUITY UNDER NATIONAL EDUCATION POLICY 2020

Dr. Harmeet Malhotra*, Dr. Charul Nigam**

*IITM, Janakpuri, New Delhi

**IITM, Janakpuri, New Delhi

ABSTRACT

In line with the ambitious goals of the National Education Policy (NEP) 2020, the incorporation of artificial intelligence (AI) into education is bringing in a revolutionary period for India's educational system. The importance of education is emphasized heavily in National Education Policy 2020. The policy statement states that education should be utilized to develop decent persons with strong moral convictions, courage, resilience, compassion, and empathy, as well as scientists and creative thinkers and rational thinkers and doers. This study explores how NEP 2020 will significantly affect the use of technology in education, with a focus on AI and adaptive learning. It looks at how customization enabled by AI can change education by adjusting it to each learner's particular needs. It also looks at how AI can be used in exams to provide customized evaluation and feedback.

Keywords: NEP2020, AI, adaptive learning.

I. INTRODUCTION

Every nation's educational institutions have a duty to liberate and empower its people, and as a result, education is a vital tool for enacting social change. India must continue to support innovation and high-caliber research in its reputable educational institutions if it is to live up to its rich history and culture of education and become a global centre of knowledge.

In India, there have been continuous efforts to create a new education policy since 2015. On July 29, 2020, the Ministry of Human Resource Development (MHRD) released the National Education Policy, following several meetings with stakeholders from the education sector regarding the draft NEP of 2019[2]. It is the outcome of a democratic process that involved gathering proposals in a bottom-up manner from thousands of villages, districts, states, and union territories. This is India's

first education policy of the twenty-first century and its third after independence, having been in place for 34 years after the last one. This information alone allows for the evaluation of NEP-2020's necessity and applicability.

The 66-page NEP paper that was released addresses every facet of education and takes a fairly inclusive stance. The scope of the coverage is astounding, timely, and futuristic, with the potential to drastically alter India's educational environment. NEP-2020 fits in with the national initiatives of the Indian government, such as Made in India, Skill India, and Atma-Nirbhar (self-reliant) India. It also takes into account the need for strong solutions for India's economic development and progress. The primary goals of NEP-2020 are to prepare students for the workforce and society by providing them with the essential 21st-century skills of experimentation, digital literacy, critical and creative thinking, and problem solving. The five guiding pillars of Access, Equity, Quality, Affordability, and Accountability form the foundation of NEP 2020. It will equip our young people to handle the many domestic and international issues of the twenty-first century. It suggests that each subject's curriculum be pared down to its "core essential" information in order to provide room for learning that is comprehensive, analytical and discussion-based.

A. NEP & ITS KEY INITIATIVES

Among the significant modifications included in NEP-2020 are:

- The Ministry of Human Resource Development (MHRD) has been renamed the Ministry of Education due to its emphasis on education rather than on it being the next step in human resource development.
- Replacing the independent AICTE (All India Council for Technical Education) and UGC (University Grant Commission) organizations with the Higher Education Commission of India (HECI), a single central academic regulator and accreditor for HEIs (higher education institutes).
- The NEP-2020 also includes revisions to the educational phases spanning from school to higher education.
- The "10+2" educational structure used in schools has been replaced with the "5 +3+3+4" design, which places more emphasis on experiential learning and enhances the quality of

teaching and learning outcomes by introducing vocational education in the form of internships to impart skills early in life for a student's holistic development.

- NEP-2020 envisions that by 2030, the gross enrolment ratio (GER), which measures access to education for all, will rise from the current 28% in school-level education and 5% in higher and professional education to 20% and 50%, respectively, due to the strengthening of infrastructure facilities across all dimensions[2].

B. SCOPE OF AI IN EDUCATION

In the realm of education, artificial intelligence (AI) is essential. Both teachers and students benefit from the automated method it offers for grading answer sheets and automating instruction. Artificial intelligence improves education in both the administrative and curriculum domains, enabling teachers to assist students considerably more successfully. It can help educators speed up the assessment process by providing feedback and identifying strengths and weaknesses of students.

Artificial intelligence provides teachers with a number of benefits, including learning analytics (LA), virtual reality (VR), grading/assessments (G/A), and admissions. Three models of artificial intelligence can be distinguished: directed, supported, and empowered AI. Every paradigm offers fresh possibilities, challenges, and opportunities for teaching methods.

The best ways to use AI for pedagogy on a bigger scale and how it can impact teaching and learning in higher education are yet unknown to educators. Advances in algorithms, large amounts of data, and inexpensively available computer power and storage are just a few of the ways artificial intelligence technology advancements help solve educational problems.

II. ALIGNMENT OF AI WITH NEP 2020 GOALS

Artificial Intelligence (AI) can play a significant role in achieving several goals outlined in the NEP 2020[5]. Here are some ways AI can align with the NEP 2020 goals:

1. **Access and Equity**: AI-powered educational tools can provide personalized learning experiences tailored to the needs of individual students, regardless of their geographical

location or socio-economic background. This can help bridge the gap in access to quality education.

2. **Quality Education**: AI can assist in improving the quality of education by providing adaptive learning platforms, intelligent tutoring systems, and educational content recommendation systems. These technologies can enhance the effectiveness of teaching and learning processes, ensuring better learning outcomes.

3. **Multidisciplinary Education**: AI promotes interdisciplinary learning by integrating concepts from various fields such as computer science, mathematics, and cognitive science. This aligns with NEP 2020's emphasis on promoting multidisciplinary education to foster critical thinking and creativity among students.

4. **Teacher Professional Development**: AI can support teacher training and professional development by offering personalized feedback, recommending teaching strategies, and facilitating access to online resources. This can help enhance the pedagogical skills of educators, aligning with NEP 2020's focus on continuous professional development.

5. **Assessment and Evaluation**: AI-powered assessment tools can provide real-time feedback on students' performance and progress. By analyzing large datasets, AI can generate insights into students' learning patterns and areas for improvement, enabling educators to offer targeted interventions.

6. **Flexible Learning Pathways**: AI-driven adaptive learning platforms can accommodate diverse learning styles and paces, allowing students to progress at their own speed. This supports NEP 2020's vision of flexible learning pathways that cater to the individual needs and interests of learners.

7. **Research and Innovation**: AI facilitates research and innovation in education by enabling the analysis of educational data, modeling learning processes, and developing intelligent educational technologies. This can contribute to the advancement of educational practices and policies as envisaged in NEP 2020.

8. **Ethical Use of Technology**: NEP 2020 emphasizes the ethical use of technology in education, including data privacy, security, and equity considerations. Integrating AI responsibly into educational practices requires addressing ethical concerns and ensuring equity in access to AI-powered tools and resources.

9. **Augmented reality and virtual reality**: AI-powered tools such as augmented reality (AR) and virtual reality (VR) are being used in higher education to create immersive learning experiences. AR and VR allow students to visualize complex concepts and interact with virtual objects in a way that was not previously possible.

Overall, aligning AI with the goals of NEP 2020 can contribute to the transformation of the education system in India, making it more inclusive, effective, and responsive to the needs of 21st-century learners. However, it's essential to implement AI initiatives in education with careful planning, stakeholder engagement, and monitoring to maximize their benefits while addressing potential challenges.

III Research Methodology

Primary and secondary data form the foundation of the research. Google Forms is used to collect primary data from respondents via questionnaires. For the objective of the study, 52 responses have been collected. Through the Ministry of Human Resource Development's NEP 2020, secondary data is gathered. Convenience sampling is the sample strategy that is employed.

IV Analysis of Data

The study was conducted with total of 50 samples. The questionnaire was filled by graduate students and were based on how much aware they are about NEP2020 and contribution of Artificial Intelligence in implementing the policy.
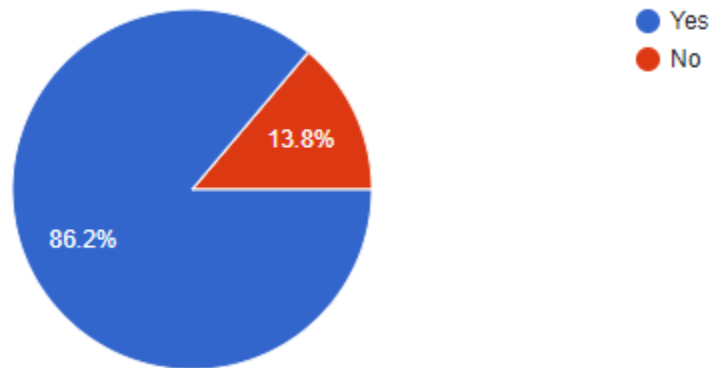
Awareness of NEP2020
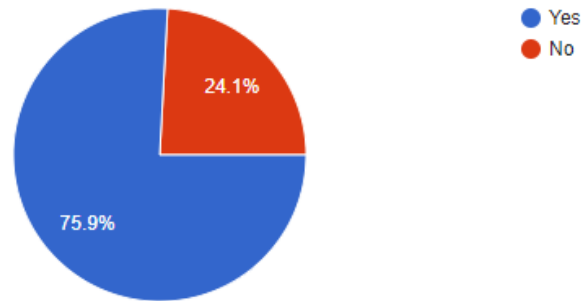
The above figure shows that 75.9% of students are aware about the policy whereas 24.1 % are still unaware about this. Generating awareness and upgrading the teaching pedagogy as per the policy will help the students in improving their academics as well as Industry skills.

**Understanding of goals and objectives of NEP 2020**
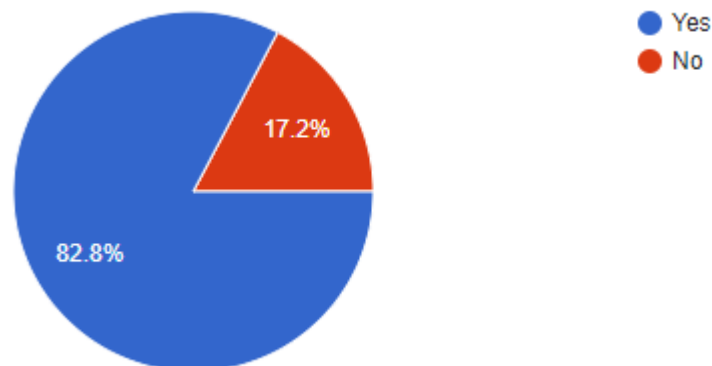
The above statistics shows that majority of students have clarity about the goals and objectives of NEP2020 whereas 17.2% know the overview of the policy but don't have in depth knowledge of its goals and objectives.

NEP 2020 addresses the issue of educational quality effectively

The 86.2% respondents agree with the fact that NEP2020 will enhance the quality of the education amongst the students.

Awareness about Artificial Intelligence (AI) in the context of education
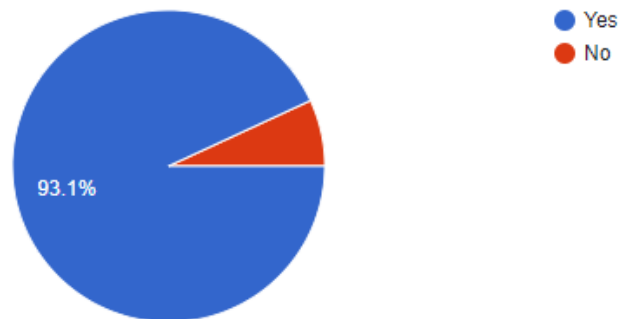
The study shows that 93.1% students are aware of the role of Artificial Intelligence in education sector. They agree that AI has given boom to Education sector by coming up with various innovation teaching learning pedagogy tools.

Awareness of AI-driven initiatives or tools aimed at promoting educational equity under NEP 2020?
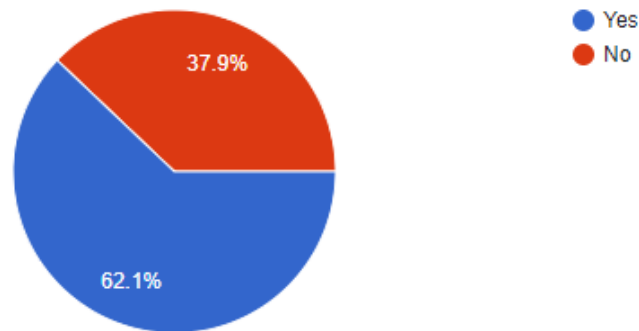
The study shows that there is still need of making the students aware about the AI-driven initiatives or tools aimed at promoting educational equity under NEP 2020. Only 62.1% respondents have used or gained knowledge of these tools.

Ethical or privacy concerns associated with the use of AI in education, especially in the context of equity
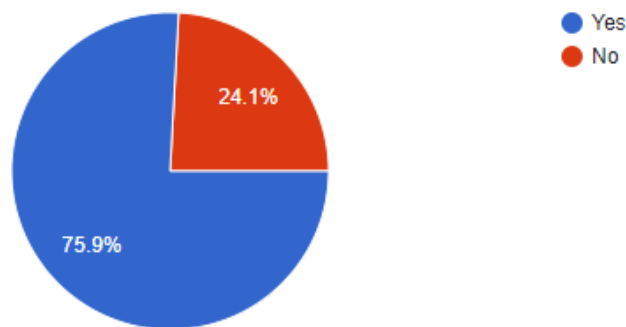
Around 75.9% students agree on this opinion that there are ethical or privacy concerns associated with the use of AI in education sector. These concerns should be taken care of while implementing them in real world scenario.

Impact of AI on the educational outcomes of marginalized or underserved communities
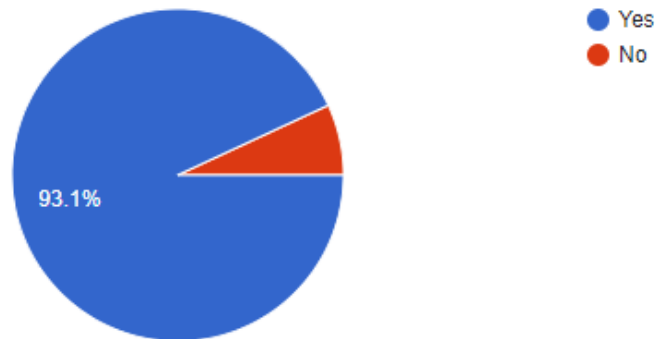
Majority of the students have the viewpoint that use of AI can have a positive impact in upliftment of marginalized or underserved communities as they can provide them with new techniques and methods of enhancing their education and also plays major role in other areas also such as healthcare, agriculture, jobs, etc.

AI has the potential to reduce disparities in learning outcomes across different demographic groups
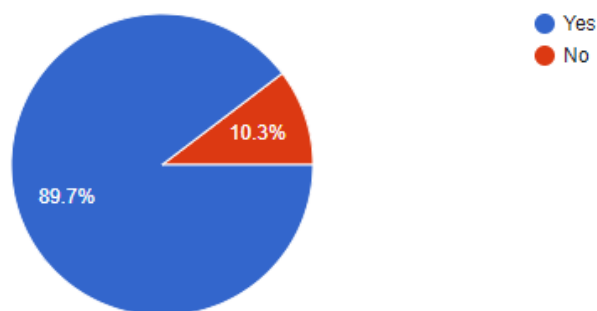
Around 89.7% respondents agree that AI can reduce the disparities in learning outcomes across different demographic groups. Only 10.3% respondents still have doubt on this aspect.

Stakeholders playing a major role in leveraging AI for educational equity under NEP 2020
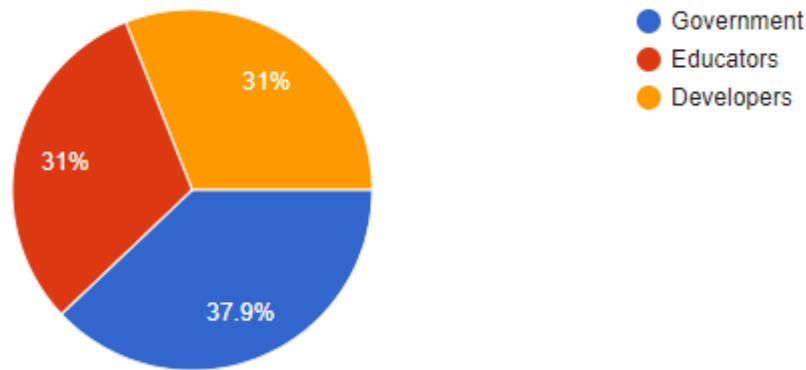
According to the respondents all these three stakeholders i.e. Government, Educators and Developers play nearly similar role in leveraging AI in educational sector. AI can help in making the tasks easier, understandable and learnablility can become more practical oriented.

Factors crucial for the successful integration of AI in promoting educational equity
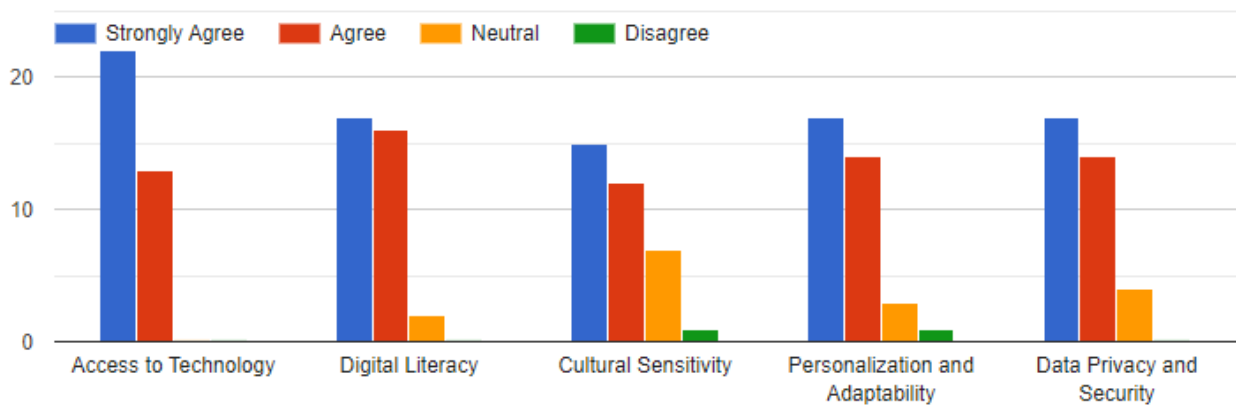
It has been observed that for successful integration of AI in NEP2020 access to technology is of utmost importance followed by digital literacy, personalization & adaptability, data privacy & security and cultural sensitivity. All these factors play a crucial role in promoting educational equity[19].

That being said, the fast spread of Artificial Intelligence (AI) is driving a major revolution in the education sector. It is currently flourishing in classrooms all over the world, bringing the idea of customized instruction and universal accessibility to life and playing a crucial role in closing the achievement gap in education. It's critical to comprehend the potent convergence of AI and learning in order to deliver equal education for all kids, regardless of their socioeconomic circumstances, as global trends in education continue to take inventive twists.

CONCLUSION

AI and other cutting-edge technology will become more and more important as the education industry develops in order to guarantee that every student receives a top-notch education. Utilizing AI, remote learning tools, and student skill development can assist NEP 2020 realize its vision and is in line with its objectives. With the help of AI-powered learning platforms, students can receive individualized recommendations for learning routes and content, enabling them to progress at their own speed and in a way that best meets their needs. Higher education is using AI-powered technologies like augmented reality (AR) and virtual reality (VR) to build immersive learning environments. Students may now visualize difficult ideas and engage with virtual things in a way that was not previously feasible thanks to AR and VR. Therefore, by utilizing AI's potential, we can close gaps, promote inclusion, and open the door to a better future for everybody.

REFERENCES

B. L. Gupta and A. K. Choubey. 2021. Higher Education Institutions – Some Guidelines for Obtaining and Sustaining Autonomy in the Context of NEP 2020. *International Journal of All Research Education and Scientific Methods (IJARESM)*, Vol. 9, Issue 1, January, 2021, ISSN: 2455-6211, Pp. 72-84 Available online at: www.ijaresm.com

National Education Policy 2020, Minsitry of HRD, Government of India. *https://www.education.gov.in/ /sites/upload_files/mhrd/files/NEP_Final_English.pdf*

India Today. (2020, August 14). *A reality check on NEP 2020: 6 major challenges in implementation*. https://www.indiatoday.in/education-today/featurephilia/story/a-reality-check-on-nep-2020-major-challenges-in-implementation-1711197-2020-08-14

Aithal, P. S., & Aithal, S. (2020a). Analysis of the Indian National Education Policy 2020 towards Achieving its Objectives. *Social Science Research Network*. https://doi.org/10.2139/ssrn.3676074

Ahmad, S. F., Rahmat, M. K., Mubarik, M. S., Alam, M. M., & Hyder, S. I. (2021). Artificial intelligence and its role in education. *Sustainability,* 13(22), 12902. https://doi.org/10.3390/su132212902

Chowdhury, M., & Sadek, A. W. (2012). Advantages and limitations of artificial intelligence. Artificial intelligence applications to critical transportation issues, 6 (3), 360 - 375.

Jaiswal, A., & Arun, C. J. (2021). Potential of Artificial Intelligence for Transformation of the Education System in India. *International Journal of Education and Development using Information and Communication Technology*, 17 (1), 142 - 158.

Jingar, P., Singh, A., & Gupta, S. (2022). Artificial Intelligence: Revolutionizing India Byte by Byte. Impact of Artificial Intelligence on Organizational Transformation, 165 - 182.

Joshi, S., Rambola, R. K., & Churi, P. (2021). Evaluating artificial intelligence in education for next generation. *In Journal of Physics: Conference Series* (Vol.1714, No.1, p.012039). IOP Publishing.

Kengam, J. (2020). Artificial intelligence in education. Research Gate, https://www.researchgate.net/ publication/347448363_ARTIFICIAL_INTELLIGENCE_IN_EDUCATION

Lame, G. (2019). Systematic literature reviews: An introduction. In proceedings of the design society: *International conference on engineering design* (Vol.1, No.1, pp.1633 - 1642). Cambridge University Press.

Liu, J., Kong, X., Xia, F., Bai, X., Wang, L., Qing, Q., & Lee, I. (2018). Artificial intelligence in the 21st century. IEEE Access, 6, 34403 - 34421.

Malik, G., Tayal, D. K., & Vij, S. (2019). An analysis of the role of artificial intelligence in education and teaching. In Recent Findings in Intelligent Computing Techniques: Proceedings of the 5th ICACNI 2017, Volume 1 (pp.407 - 417). Springer Singapore.

Makridakis, S. (2017). The forthcoming Artificial Intelligence (AI) revolution: Its impact on society and firms. *Futures*, 90, 46 - 60.

Ouyang, F., & Jiao, P. (2021). Artificial intelligence in education: The three paradigms. Computers and Education: Artificial Intelligence, 2, 100020.

Srivastava, P., Hassija, T., & Goyal, A. P. (2020). Unleashing the Potential of Artificial Intelligence in the Education Sector for Institutional Efficiency. *In Transforming Management Using Artificial Intelligence Techniques* (pp.11 - 22). CRC Press.

Verma, A., & Agrawal, R. (2021). Has the Product Patent Regime Impacted Mergers and Acquisitions? Unveiling with a Systematic Literature Review. *FIIB Business Review*, 231971452110313. https://doi.org/10.1177/23197145211031314

TRANSFORMATION OF THE BANKING SECTOR AND THEIR

SERVICES IN BANGLADESH USING ARTIFICIAL INTELLIGENCE

Dr. Sarmistha Sarma[*],   Komal Prity[**]
[*]Professor, Asian Business School, Noida, Uttar Pradesh
[**]Student, Asian Business School, Noida, Uttar Pradesh

ABSTRACT

The present day is the age of digitalization, and artificial intelligence (AI) has played a major role in our daily lives. The acceptance of digital technology has significantly transmuted Bangladesh's financial industry in the preceding decade and a half. The advancement of technology has given a new dimension to various banking sectors and their services in Bangladesh. The purpose of writing this paper is to understand how AI works in the various elements of the financial sector to make it more effective with prime utilization of resources and accuracy of predictions and decisions. This research report identifies AI adoption opportunities for Bangladesh that can transcend its future prospects towards greater prosperity. This paper explored the performance and efficiency of banks working in Bangladesh. This paper gives precise suggestions, one of which is adopting the integrated AI and blockchain model, which will be much safer and more effective in allocating maximum security, privacy, and accuracy. This paper explains the threats or challenges at different levels of banking facilities in Bangladesh where banks should avoid the implementation of AI or robotics in banking operations.

Keywords: *Artificial Intelligence, Digital Technology, Blockchain Technology, Machine Learning, Robotics, and Banking Services.*

INTRODUCTION

 The banking sector of Bangladesh has undergone a remarkable transformation in recent years, marked by fundamental transformation in its operations, service delivery, and customer engagement. This transition has been initiated by a potent force of change, i.e., AI. AI's unprecedented capacity to process, analyse, and learn from data has developed as a revolutionary catalyst, reshaping the domain of financial services in Bangladesh.

As a country with a growing economy and a burgeoning population, Bangladesh's banking sector is crucial in facilitating economic growth, financial inclusion, and modernization. This

journey of transformation encompasses areas such as customer service, fraud detection, risk management, and product development. The integration of AI chat agents has redefined customer interactions, enhancing their responsiveness, efficiency, and available round the clock.

In the context of risk management, machine learning algorithms and AI's predictive analytics have improved the reliability of credit scoring and fraud detection, minimizing exposure to financial risks and fraudulent activities. This transformative approach has not only improved its service standards but has also supported financial inclusion, reaching financially excluded and financially marginalized populations by offering more accessible and affordable banking services through digital channels. The implementation of AI technologies has ushered in an innovative age of efficiency, innovation, and risk management in banking. However, the integration of AI in banking services also brings forth a complex set of legal obstacles and evaluations that require careful examination.

AI IN BANKING: A TRANSFORMATIVE REVOLUTION

AI's implementation in banking has led to a plethora of benefits. It has significantly enhanced customer experiences by enabling personalized services, chatbots for customer support, and efficient data analysis. AI-driven algorithms have revolutionized risk assessment, fraud detection, and investment recommendations, making the banking sector more flexible and secure.

LEGAL IMPLICATIONS OF AI IN BANKING

1.   Data Confidentiality and Security: In the banking sector, this primarily involves complying with laws such as the General Data Protection Regulation (GDPR) and local data protection laws in Bangladesh.

2.   Transparency and Explainability: Banks need to ensure that their AI systems are transparent and explainable to comply with regulations and to build trust with customers and regulators.

3.   Fair Lending and Bias: The legal framework in banking requires that lending practices are fair and unbiased. Regulators closely monitor AI systems to prevent discriminatory practices.

4.   Regulatory Compliance: AI applications must adhere to existing financial regulations, and sometimes new regulations specific to AI may be required.

5.   Contractual and Liability Issues: AI contracts and liability for AI-driven decisions require legal scrutiny. Determining who is liable in cases of AI errors or misconduct is a complex legal question that banks need to address.

THE ROLE OF LEGAL EXPERTS

As the banking sector increasingly relies on AI technologies, the demand for legal experts who specialize in AI and financial law has grown. Legal professionals play a vital role in ensuring that banks navigate the evolving legal landscape successfully. They help banks interpret and comply with existing regulations, lobby for new legislation where needed, and address legal threats associated with AI integration.

LITERATURE REVIEW

1.   Md. Shihab Uddin Khan et al. (2021): This study aims to explore the prospective role of AI within the banking sector. Its objectives encompass several key areas, such as exploring into the conceptual aspects of AI and RPA, delineating the worldwide landscape of AI, and its integration within banks and financial institutions within Bangladeshi banks. The paper aims to propose recommendations to enhance the preparedness for AI-powered digital banking in Bangladesh.

2.   Mustak Ahmed (2022): The objective of this research report is to explore the potential opportunities for AI adoption in Bangladesh, aiming to propel its future prospects towards greater prosperity. Bangladesh has made impressive milestones in applying various technologies across sectors. Even with these innovations, obstacles remain continue in the integration of AI. The government has executed preventive strategies by introducing various policies and regulations to refine the implementation of AI in Bangladesh.

3.   Walid Al-Saqaf and Nicolas Seidler (2017): This article seeks to contribute to the existing body of knowledge by examining the potential applications of blockchain technology and their boundaries. It investigates whether the fundamental operational principles of blockchain could serve as mechanisms to reduce excessive online surveillance, censorship, and human rights violations perpetuated by the consolidation of control over online

information by a few entities. Through this exploration, the article aims to spark scholarly interest in comprehending both the possibilities and concerns regarding the potential societal influence of blockchain technology.

4. **Syeda Nusrat (2021):** The accessibility of financial services in Bangladesh has historically been constrained. This study investigates the potential of utilizing blockchain technology to enhance financial inclusion in Bangladesh. It explores the utility of blockchain, identifies challenges hindering its successful implementation, and offers recommendations aimed at facilitating its effective application in the banking sector.

5. **Abdullah Al Hussain et al. (2022):** The essence of blockchain technology lies in its distributed database system, which prioritizes transparency, accountability, public accessibility, immutability, and traceability of stored data. The lack of a well-structured Blockchain Technology Acceptance Model (TAM) in Bangladesh restricts the perspective of local developers and researchers. Sectors such as governance, healthcare, security, privacy, agriculture, information authentication, cryptocurrencies, internet architecture, and data management are unable to utilize the complete capabilities of this technology. This research focused on Bangladesh, exploring various aspects of blockchain technology and its potential applications in these sectors.

6. **Md. Mainul Islam Ron et al. (2023):** The growing interest in blockchain technology within the mobile banking system arises from its strong security measures, enhanced data accessibility, accelerated transaction processing, and decentralized database structure. Exceeding fundamental transactions, cellular banking provides access to account information, facilitates payments, manages deposits and withdrawals, enables transfers, offers investment insights, provides ATM support, and provides diverse content services.

One pivotal technology within this aspect is Distributed Ledger Technology (DLT), commonly referred to as blockchain. This tamper-proof digital ledger system securely stores and disseminates data across connected nodes. This study specifically focuses on integrating consortium blockchain technology and the Proof of Authority (POA) consensus protocol into Bangladesh's mobile banking system. It discusses a proposed blockchain architecture model, outlining its classification and consensus protocol.

AI IN THE FINANCIAL SECTOR OF BANGLADESH

Bangladesh has adopted AI technologies for the banking sector for a smoother electronic transition with their customers. Due to the complexity of those sectors, they accepted AI technology quickly and used it to boost services related to customers. The government has planned to install a system at the bank to reduce fraud-related activity. Modification of some government policies leads to changes in developing finance sectors.

AI and ML make it easier to magnify the capability to forecast economic, financial and risk events, modify the financial market, upgrade risk management and compliance, reinforce provident oversight, and provide central banks with new apparatus to pursue their monetary and macro-prudential instruction.

Artificial intelligence (AI) is increasingly being used in various elements of the financial sector in Bangladesh to enhance efficiency, accuracy, and decision-making. AI is applied in the financial sector in Bangladesh as follows:

➢ **AI Chat Agents:** AI chat agents such as virtual assistants and chatbots are used to provide immediate customer support, resolve concerns, and help in fundamental transactions.

➢ **Natural Language Processing (NLP):** NLP technology is used to analyse customer feedback and sentiment, enabling banks to improve their services and products.

➢ **Credit Scoring Models:** AI algorithms are used to assess the creditworthiness of borrowers by analysing their financial history, transactions, and other data.

➢ **Fraud Detection:** AI is employed to detect and prevent fraudulent activities by identifying unusual patterns and anomalies in transactions.

➢ **Robo-Advisors:** AI-driven robo-advisors provide investment advice and portfolio management services to clients, supporting them in making knowledgeable investment choices.

➢ **Algorithmic Trading:** AI algorithms execute trades based on market data, identifying profitable opportunities, and mitigating risks.

➢ **Big Data Analytics:** AI is used to process and analyse large volumes of financial data to identify trends, customer preferences, and market opportunities.

➢ **Predictive Analytics:** AI models make predictions about market trends, customer behaviour, and investment opportunities, enabling more informed decision-making.

➢ **Cybersecurity:** AI-based security systems help ensure the security of sensitive financial data against cyber threats, and breaches.

➢ **Compliance Monitoring:** AI is used to monitor transactions and ensure adherence to regulatory requirements, reducing the risk of non-compliance.

➢ **Personalization:** AI helps banks personalize their services by analysing customer data to offer tailored product recommendations, and experiences.

➢ **Churn Prediction:** With the assistance of AI predictive models, banks can anticipate when customers are on the edge of leaving, allowing banks to take proactive steps to retain them.

➢ **Robotic Process Automation (RPA):** RPA is applied to automate regular

responsibilities like data input and document processing, reducing operational costs, and improving efficiency.

➢ **Workflow Optimization:** AI helps optimize internal processes, such as loan approval workflows, by identifying bottlenecks and suggesting improvements.

➢ **Anti-Money Laundering (AML):** AI systems assist banks in monitoring transactions for suspicious activity and ensuring compliance with AML regulations.

To make AI more effective in the financial sector in Bangladesh, banks need to:

➢ Invest in AI infrastructure, including data storage and computing resources.

➢ Train and upskill their staff to work with AI systems.

➢ Collaborate with AI solution providers and fintech start-ups to access the latest technologies.

➢ Ensure data privacy and security to build trust with customers and regulators.

➢ Continuously update and improve AI models to stay competitive and compliant with changing regulations.

➢ AI can significantly enhance the efficiency and accuracy of financial operations while providing valuable insights for decision-makers in Bangladesh's banks.

AI ADOPTION OPPORTUNITIES FOR BANGLADESH AND ITS FUTURE PROSPECT

The present age is the age of digital transformation, and artificial intelligence has played a crucial role in daily life. From the perspective of Bangladesh, the AI has played a crucial role in making them a rapidly developing country in South Asia. Bangladesh has recently acquired all the technologies to expand every sector. The government has implemented various policies and rules to improve the application of AI in Bangladesh. The actual suggestion of this technology will help Bangladesh make the nation better. In this light, it is important in the context of Bangladesh's governance of to take some innovative steps with a view to execute AI across all service sectors.

With the technological globalization and services, progressing and undeveloped countries are also acquiring the application of artificial intelligence. Emerging nations such as Bangladesh have been able to achieve improvement in the social lives of their people by making it easier, and by contributing benefits in terms of medical care, crime control, education, and means of transportation. Extensive adoption of artificial intelligence is responsible for the new employment options of the new generations in Bangladesh. Moreover, these new options enable more educational prospects for the students, which will enable the future generation to be theoretically and practically exposed to different aspects of AI applications.

Bangladesh can acquire a lot from the great and strategic use of AI in terms of future possibilities. AI has so far been effective in several sectors of Bangladesh. The government can incur more profit from AI by applying it in different ways. The administrations of different sectors should recruit and involve more experts to explore new breakthroughs in the technological field with the maximum benefit from AI.

AI adoption presents numerous opportunities for Bangladesh that can help transcend its future prospects toward greater prosperity. AI integration has the capacity to drive economic growth, increase efficiency, and improve living standards for the people of Bangladesh. The following segments highlight important fields where AI can make an important impact:

➤ **Agriculture and Food Security:** AI can be used for crop monitoring, disease detection, and precision agriculture, improving crop yields and food security.

➢ **Healthcare and Telemedicine:** AI-powered diagnostic tools can extend healthcare access to underserved areas, in the course of predictive analytics assist to manage disease outbreaks and healthcare resources more effectively.

➢ **Education and Skill Development:** AI-driven online education platforms can provide accessible and personalized learning experiences, promoting skill development and increasing the employability of the workforce.

➢ **E-commerce and Retail:** AI can enhance customer recommendations, optimize supply chain management, and improve the overall e-commerce experience, driving growth in the cyber marketplace.

➢ **Financial Inclusion:** AI can help expand financial inclusion facilities to the financially marginalized populations by enabling digital banking, microloans, and risk assessment for previously underserved customers.

➢ **Infrastructure and Smart Cities:** AI can improve traffic management, waste disposal, and energy efficiency in urban areas, contributing to more sustainable and liveable cities.

➢ **Manufacturing and Industry 4.0:** Adoption of AI-driven automation, robotics, and predictive maintenance can enhance the competitiveness of the manufacturing sector and promote exports.

➢ **Energy and Sustainability:** AI can optimize energy production and consumption, increasing energy efficiency, and reducing environmental impact.

➢ **Public Services and Governance:** AI can streamline public service delivery, enhance e-governance, and improve transparency in government operations.

➢ **Textile and Garment Industry:** AI can be used for quality control, production optimization, and supply chain management in the textile sector, which is a significant contributor to Bangladesh's economy.

➢ **Financial Technology (Fintech):** AI-driven Fintech solutions can facilitate faster and more secure financial transactions, promote financial literacy, and improve access to credit for individuals and small businesses.

➢ **Disaster Management:** AI can aid in advance cautionary systems for natural disasters and assist in the sphere of disaster relief and recovery efforts.

To maximize the potential benefits of AI adoption, Bangladesh should focus on the following:

➢ **Education and Workforce Development:** Invest in education and training programs to develop a skilled AI workforce that can drive innovation and implementation.

➢ **Regulatory Framework:** Establish clear and supportive regulations for AI adoption, ensuring data privacy and ethical AI use.

➢ **Research and Innovation:** Promote research and development in AI technology and support start-ups and innovation hubs.

➢ **Infrastructure and Connectivity:** Improve digital infrastructure, including internet access and data connectivity, to enable widespread AI deployment.

➢ **Public-Private Partnerships:** Support collaboration between government, academia, and the private sector to drive AI initiatives and investments.

THE PERFORMANCE AND EFFICIENCY OF BANKS OPERATING IN BANGLADESH

The performance and efficiency of banks operating in Bangladesh can vary widely depending on various factors, including the bank's size, management, business strategies, and market conditions. Banks in Bangladesh are subject to regulations and oversight by the Bangladesh Bank (Central Bank of Bangladesh), which is critical for ensuring the stability and efficacy of the banking sector.

It is important that the proficiency and efficacy of individual banks vary, and some banks may outperform others in specific areas. Periodic assessments and evaluations by the Bangladesh Bank and independent credit rating agencies help monitor and ensure the health within the banking domain in Bangladesh.

The economic advancement of Bangladesh heavily relies on the banking sector, yet it faces several difficulties like liquidity issues, capital shortages, non-performing loans, inefficiencies, and so on. Well-organized banks can achieve maximum profit using the minimum amount of inputs, like operating and interest liabilities, asset pool, capital pool, total investment, total shareholders' equity, and the minimum number of branches and employees. Following is the performance evaluation of banks:

➢ **Capital Sufficiency of Banks:** Higher capital sufficiency increases the depositors' confidence and prevents the banks from going bankrupt in an unfortunate situation.

> **Asset Quality of Banks:** To a large extent, the profitability of a bank depends on the potential of its assets to generate income. Non-performing loans can intimidate the quality of assets.

> **Management Soundness of Banks:** The survival and profitability of a bank depend on the management soundness of the bank.

> **Earnings Capability of Banks:** If the bank has better earnings capability, it can afford to assist with future unforeseen shocks. As a result, higher earnings capability indicates the better performance of the bank.

> **Liquidity Position of Banks:** Every bank should continue to maintain a reserve of liquid funds to hold its short-term liabilities and meet the demand for cash from its customers. If it fails to meet the demand of its customers, then it is known as a liquidity risk.

> **Vulnerability to Market Risk:** Vulnerability to market risk is the standard to which changes in lending charges, international currency rates, equity prices, and commodity prices negatively impact the earnings of the banks.
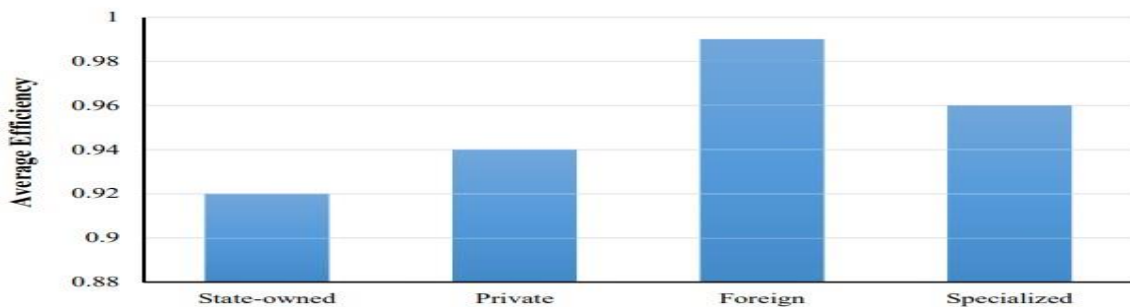
Fig. 01: Average Efficiency of Different Categories of Banks in Bangladesh

Efforts to improve the proficiency and efficacy of banks in Bangladesh often involve regulatory reforms, technology investments, risk management enhancements, and corporate governance improvements. Plus, competition and customer expectations continue to drive innovation and efficiency in the sector. Presented below are some important aspects that influence the performance and efficiency of banks in Bangladesh:

> **Asset Quality:** The quality of a bank's loan portfolio is a critical indicator of its performance. Non-Performing Loans (NPLs) can affect a bank's profitability and overall stability. Banks with effective credit risk management tend to perform better.

- ➤ **Profitability:** A bank's profitability is a key indicator of its performance. Factors such as interest profit, fee revenue, and cost management hold a key responsibility in determining a bank's financial health.

- ➤ **Capital Adequacy:** Adequate capital is important to absorb losses and support growth. Banks must satisfy the minimum capital standards as per Basel III standards to ensure stability.

- ➤ **Liquidity Management:** Managing liquidity effectively is essential for meeting depositors' demands and fulfilling the bank's obligations. Liquidity risk management is essential for continuing financial stability.

- ➤ **Technology Adoption:** The efficiency and competitiveness of banks often depend on their capability to adopt modern technologies, incorporating online banking, mobile banking, and digital payment systems. Efficient use of technology can optimize customer service and operational efficiency.

- ➤ **Corporate Governance:** Effective corporate governance techniques, including transparent financial reporting, effective risk management, and ethical behaviour are critical for a bank's long-term success.

- ➤ **Regulatory Compliance:** Banks must adhere to regulations and guidelines set by the

  Bangladesh Bank. Compliance with Anti-Money Laundering (AML) and Know Your Customer (KYC) regulations is especially crucial.

- ➤ **Market Competition:** Market rivalry in banking can impact the proficiency and efficacy of banks. Banks need to adapt to changing market dynamics and customer preferences.

- ➤ **Economic Conditions:** Economic factors such as interest rates, inflation, and overall economic stability can influence a bank's performance. An unstable economic environment may pose challenges for banks.

- ➤ **Customer Base:** Building a strong and diverse customer base, including retail and corporate clients, can positively impact a bank's revenue and growth prospects.

ADOPTING THE INTEGRATED AI AND BLOCKCHAIN MODEL IN MAXIMUM SECURITY, PRIVACY, AND ACCURACY

AI is a tool that has the capacity to derange and transform entire industries. The application of AI in business has been mainly allowed by the AI-powered operational machine learning

technology to carry out specific tasks. The technology and the term itself can be traced to the mid-20th century, when scientists and researchers first began to explore the idea of intelligent machines. They started to generate algorithms and software that were able to perform rudimentary activities that would typically necessitate human intelligence. Quantum computation and neuromorphic computation represented significant milestones in the advancement of artificial intelligence.

The blockchain is a technological innovation that keeps important data secured and encrypted, which will switch the banking sector in Bangladesh. Blockchain technology can open up a lot of possibilities for Bangladesh. From sharing rides to the financial sector, land management, and medical fields, it is possible to capitalize on numerous benefits from this technology. It is a kind of database (DB). In other words, a digital ledger is a ledger or record of blockchain transactions. Each discrete record is called a block that is linked together in a list called a chain. Every block in the blockchain is fully immutable. Immutable means that once a block is added to the chain, it is not possible to change it. The blocks perch beside each other in the order of their creation. Each block has knowledge of which block is before it. This field of information technology is now being accepted in many countries. Exertion has also started on this issue in Bangladesh. If this technology is put in place at the government and private levels, Bangladesh will accelerate the digital process.

Blockchain can transmute the banking sector. All the branches have a large ledger to note all the transactions of the bank, and the banks that use banking software have this note in the database (DB). This large ledger is known as a laser. However, for an authentic transaction, it must have an entry in the bank ledger. A blockchain is a laser that has many such blocks besides. Each block holds all the data of the transactions that have transpired in the world periodically. This data is available but encrypted, which means everyone can view it but cannot read it. For reading that data, a private key is required. This means that if a person transacts here, only that person can read all the details of the transaction from here using its private key; no one else can.

So, this transaction is real-time, problem-free, paperless, and cost-effective as well. As a result of this fortunate transaction, many banks in Bangladesh are anticipated to come up with such automated techniques in trade to furnish comfortable service to their customers. Transaction banking is switching quickly through the use of digital technology.

The adoption of an integrated AI and blockchain model in the banking sector in Bangladesh has the potential to bring significant benefits. The following are some ways in which this model could prove beneficial for banks in Bangladesh:

➢ **Security:** Bangladesh has faced challenges related to cybersecurity and data breaches. Blockchain technology's immutability and cryptographic features can provide enhanced security for financial data. It can secure sensitive data, preventing unauthorized access and tampering.

➢ **Privacy:** The privacy of financial data is of utmost importance. Blockchain's permissioned network can allow banks to control access to sensitive information, ensuring that customer data remains confidential. AI can assist in enforcing privacy rules and detecting any breaches of privacy.

➢ **Accuracy:** Ensuring the accuracy of financial data is crucial for banks. Blockchain's stability ensures post data acquisition, it remains accurate and consistent. AI can help in data validation and reconciliation, reducing errors caused by manual processes.

➢ **Complex Tasks:** Banks in Bangladesh often deal with complex financial tasks. AI can automate processes like risk assessment, fraud detection, and customer service, making these tasks more efficient and accurate. Additionally, smart contracts on the blockchain can simplify complex financial agreements and reduce the requirement for intermediaries.

➢ **Transparency:** Transparency is essential for trust in the banking sector. Blockchain's distributed ledger technology provides transparency by recording all transactions on a ledger accessible to authorized parties. This can help to improve trust and accountability.

➢ **Compliance:** Banks in Bangladesh must adhere to various regulatory requirements.

Blockchain and AI can assist banks in meeting these requirements by providing a transparent and auditable record of transactions. This can simplify compliance reporting and reduce the threat of regulatory penalties.

➢ **Financial Inclusion:** Bangladesh has achieved notable advancements in improving financial inclusion. AI and blockchain can further this goal by providing more efficient and cost-effective banking services, particularly for those in underserved areas.

THREATS OR CHALLENGES AT VARIOUS LEVELS OF AI OR ROBOTICS ADOPTION IN BANKING OPERATIONS

While AI and robotics offer significant benefits to the banking sector in Bangladesh, there exist particular obstacles challenges and threats that may necessitate caution and avoidance in some areas, as follows:

➢ The bank should avoid adopting AI or robotics beyond the regulatory boundaries, even though the adoption of AI or robotics could have yielded better results. Banks also must think about the long-term ROI of AI or robotics.

➢ When the bank's resources are not capable enough to utilize the capacities of AI or robotics to the fullest, it should not invest in AI or robotics. Instead, they should first invest in human resources development because, without placing the right resources in the right places, entire automation can fail, no matter how robust it is.

➢ There are numerous hazards and vulnerabilities posed by artificial intelligence in the banking industry, ranging from its difficulty in interpretation to its biased nature, narrow focus, and usability issues with other systems, which banks must evaluate if they decide to use AI in their systems. Banks should begin with the least crucial system and work their way up.

➢ The bank avoid or go off this AI adoption. Banks can benefit from AI and big data solutions with the proper use of applications.

➢ If AI-based solutions are not secured or if information regarding customers and banking processes is not ensured with proper confidentiality, the integration of AI or robotics in banking operations or services should be avoided or perished.

➢ The production and maintenance of AI require high costs as they require very costly and complex machines. The procedure to restore the system and recover lost data may require a huge amount of time and money. So, before implementing AI within the banking sector, banks should maintain the deep thought about this challenging issue because if banks cannot recover from critical AI failure to start banking operation for a long time, it will bring us disastrous destruction in business.

Despite the tremendous benefits of AI adoption in banks, there are some scenarios explained below where banks may avoid implementing AI:

➢ **Highly Expensive:** Because artificial intelligence is extremely complicated, it necessitates exorbitant production and maintenance costs. AI also consists of powerful software programs that must be updated on a regular basis to match the changing needs of the environment.

➢ **Wrong Judgment Calls:** Although artificial intelligence can learn and grow, it cannot make decisions like humans. In specific circumstances and judgment calls, only humans can make decisions, which AI may never be able to achieve. Replacing adaptive human behaviour with AI may result in illogical behaviour within humanthing ecosystems.

➢ **Risk and Take Control Away from Humans:** There is a perpetual concern about AI supplanting humans. Artificial intelligence can give a lot of power to the few people who control it. AI poses the potential to take authority away from humans while demeaning behaviours in a variety of ways.

INNOVATIONS ARE TRANSFORMING THE BANKING SECTOR IN BANGLADESH

The acquisition of digital technology has significantly transmuted the financial sector of Bangladesh in the last fifteen years, leading to millions of under-banking services that have even covered the village level. The transformation made it simpler for customers to get these services, as they could execute their transactions from the comfort of their homes. Besides the improvement of the traditional banking system, the initiation of Mobile Financial Service (MFS) providers, payment service providers, and fintech has crucial impact on acquiring technological innovation in the country's banking system. Apart from agent banking taking banking services to villages, banks are turning out Cash Recycling Machines (CRMs) that produce faster deposits, and internet banking is making possible the customer's trouble-free cash withdrawal, deposit, and fund transfer services.

1. Mobile Financial Services (MFS): 10 years ago, utilizing financial products and approaches to financial services were not available and were also expansive for many individuals and businesses in Bangladesh.

Mobile Financial Services

Mobile Financial Services (MFS) comparative summary statement of July, 2023 and August, 2023

Serial no.	Description	Amount in July, 2023	Amount in August, 2023	% Change (July, 2023 to August, 2023)
A.	Industry Wise Information			
1	No. of Banks currently providing the Services	13	13	
2	No. of agents	1601445	1618988	1.1%
3	No. of registered clients in Lac	2096.14	2124.20	1.34%
4	No. of active accounts in Lac*	712.42	819.63	15.05%
5	No. of total transaction	483531787.00	512290724.00	5.95%
6	Total transaction in taka(in crore BDT)	98306.75	109555.15	11.44%
7	No. of daily average transaction	15597800.00	16525507.00	5.95%
8	Average daily transaction (in crore BDT)	3171.19	3534.04	11.44%

Fig. 02: MFS Comparative Summary Statement of July 2023 and August 2023

The initiation of MFS, which permits its customers to regulate financial transactions remotely using a mobile device, has paved the way for millions of people to be added to the financial system.

2. Agent Banking: Bangladesh Bank initiated agent banking in their nation in 2012 by issuing a guideline pointing to providing a safe alternate delivery channel of banking services to the needy and underserved population who normally live in geographically remote areas beyond the reach of traditional banking networks. The agent banking sector saw quick growth as a substitute for the branch-based banking model in Bangladesh, especially in rural areas where arranging full-fledged offices is not economically feasible due to their low business volume.

As per the BB data, the total count of deposit accounts through agent banking was 1.92 crore as of April 2023. The total number of male accounts was 9,454,085, female accounts were 9,458,239, and other deposit accounts were 2,85,519. As per the central bank data, the total count of deposit accounts through agent banking was 1.98 crore as of June 2023.

3. Internet Banking: Internet banking (also called online banking) permits users to conduct financial transactions over the internet and furnishes consumers with practically every service formerly available only through a local branch, like deposits, transfers, and bill payments. Banks started achieving a wide range of inventiveness in 2010 as a part of their efforts to encourage customers to acquire the digital window. As per the most recent figures, the total

count of online banking customers enlarged to a record 74.4 lac in July 2023, a rise from 54.7 lac in July 2022, and 62.5 lac in December 2022. Bangladesh Real Time Gross Settlement

(BGRTGS) and Bangladesh Electronic Funds Transfer Network (BEFTN) governed by

Bangladesh Bank have also enhanced internet banking. Customers can immediately settle transactions of large volumes through RTGS, while BEFTN helps them execute retail transactions within a day.
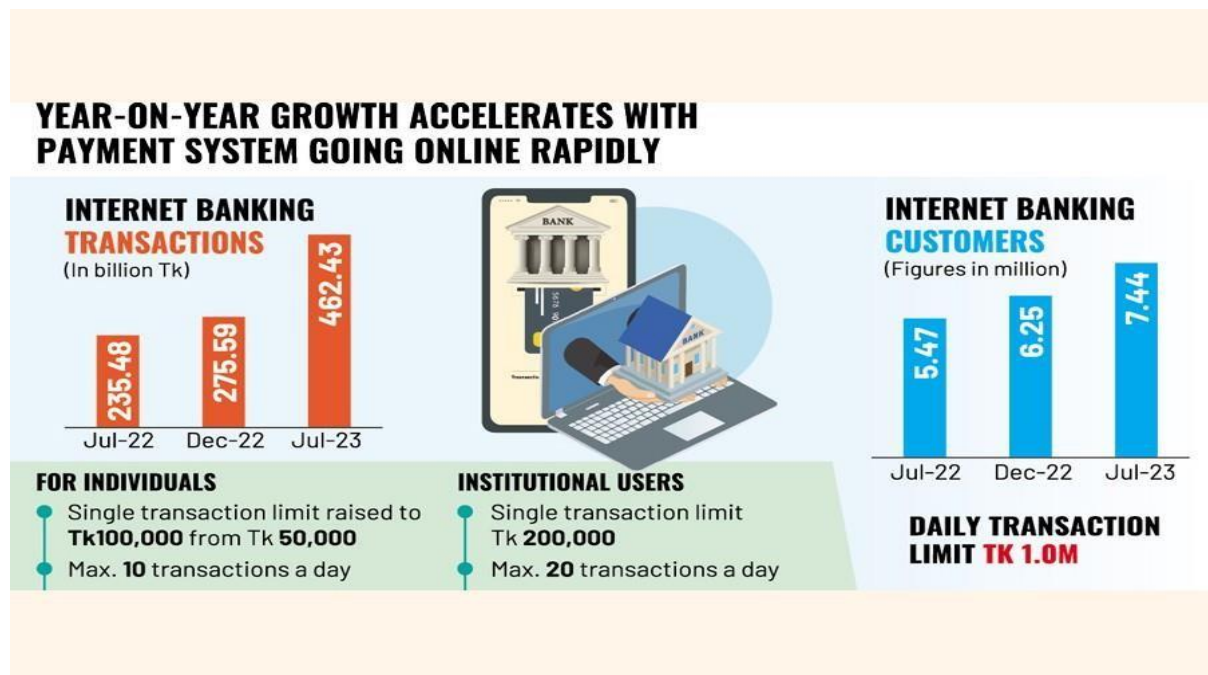
Fig. 03: Internet Banking Customers and Transactions

4. CRM: Cash Recycling Machines (CRMs) present a technology that modifies the country's financial sector. Banks are strongly installing CRMs to provide faster deposit and cash withdrawal services to customers. A CRM receives cash, counts the notes, validates them, and credits the amount in accounts on an actual basis. Serving banks do this aside from the manual labour required for the service. The new technology is also permitting customers to deposit and transfer cash into others' accounts. Banks in Bangladesh began setting up CRMs in 2017. The number of CRMs in functioning was 2,668 as of January 2023, up 111% year-on-year, according to data from Bangladesh Bank. The total transactions through CRMs increased 70% year-on-year to Taka 6,380 crore at the same time.

5. E-KYC: Opening an account without visiting a bank has always been awkward work for customers. In January 2020, the Bangladesh Financial Intelligence Unit released the electronic Know Your Customer (e-KYC), making it possible for customers to bank accounts in just five minutes, a line of action that formerly took two to four days. The system is now cutting the existing KYC-related costs by as much as 80%.

These transitions are not just transmuting the way banking services are furnished but are also inflating financial inclusion and availability for a broader segment of the population in Bangladesh.

IMPACT OF ARTIFICIAL INTELLIGENCE ON THE BANKING SECTORS AND ITS IMPLICATIONS

Artificial intelligence has had a significant impact on the banking sector in Bangladesh, as it has globally. Listed below are some fundamental pathways in which AI has influenced the operations, services, competitiveness, regulatory framework, and customer experiences in the Bangladeshi banking industry:

➢ **Process Automation:** AI-powered tools and algorithms have been used to automate various manual and time-consuming tasks in banking operations, such as data entry, document processing, and customer on-boarding. This has resulted in improved operational efficiency and reduced the risk of errors.

➢ **Chatbots and Virtual Assistants:** Many Bangladeshi banks have adopted AI-driven chatbots and virtual assistants to provide 24/7 customer support, answer queries, and assist with routine banking tasks, improving customer service availability.

➢ **Personalized Recommendations:** AI algorithms analyse customer data to offer personalized product recommendations and financial advice, enhancing the customer experience, and increasing cross-selling opportunities.

➢ **Enhanced Risk Management:** AI-based risk assessment models help banks in Bangladesh to more accurately assess credit risk, detect fraudulent activities, and manage non-performing loans. This improves their financial stability and competitiveness.

➤ **Cost Reduction:** Automation of processes through AI reduces operational costs, allowing banks to offer competitive interest rates and fees to attract and retain customers.

➤ **Data Privacy and Security:** The implementation of AI in banking has resulted to an increased focus on data privacy and security. Regulatory authorities in Bangladesh have adapted to include guidelines on data protection, cybersecurity, and the ethical AI implementation in banking operations.

➤ **Faster Transactions:** AI-driven technologies such as real-time transaction monitoring and instant fund transfers have significantly improved the speed and convenience of banking services.

➤ **Predictive Analytics:** AI enables banks to predict customer needs, identify potential issues, and offer proactive solutions, leading to a more satisfying customer experience.

➤ **Financial Inclusion:** AI is employed to extend banking services to underserved and unbanked populations in Bangladesh. Mobile banking apps and digital wallets, often powered by AI, provide easy access to financial services for a broader segment of the population.

➤ **Compliance and Reporting:** AI is used to streamline regulatory compliance and reporting by automating data collection and analysis, reducing the risk of noncompliance.

CONCLUSION

Artificial intelligence has had a remarkable effect on the banking sector in Bangladesh, as it has globally. The integration of AI in the banking sector also comes with obstacles, along with worries about data security, the ethical AI implementation, and the requirement for a proficient employees to manage AI systems. Regulatory authorities must strike a balance between encouraging innovation, and ensuring data privacy and security. AI has transformed the Bangladeshi banking sector by improving operational efficiency, customer service, competitiveness, and regulatory compliance. As AI continues to advance, banks in Bangladesh will need to adapt to remain competitive and meet evolving customer expectations while addressing ethical, and regulatory considerations.

Bangladesh has proved its significance on a worldwide scale technological field. Bangladesh can acquire a better position within the global economy by involving more AI integration in

the workplace and other activities. With the implementation of better and more effective strategies and useful steps in the application of AI to the various systems, Bangladesh can achieve more eco-friendly users.

Blockchain technology is capable of significantly transform the banking sector in Bangladesh. Although the incorporation of blockchain within the country's financial institutions is in its initial phase, there are several key reasons to anticipate its crucial role in reshaping the sector in the near future. The government, financial institutions, and technology companies need to collaborate and invest in blockchain solutions to unlock these advantages and reshape the banking landscape in Bangladesh.

While AI and robotics offer tremendous potential to enhance the banking sector in Bangladesh, banks must approach their adoption with caution and carefully consider the potential threats and challenges associated with these technologies. It is essential for banks to strike a balance between leveraging automation for efficiency and maintaining the human touch, ensuring data security and privacy, addressing algorithmic bias, and staying compliant with regulations.

Innovations are undeniably transforming the banking sector in Bangladesh, and the consequence of these advancements is already evident and promising. These transitions are leading to important advancements in the conduct of banking in Bangladesh. The ongoing innovations in the banking sector in Bangladesh have the capability to enhance financial services, making them more accessible, secure, and efficient, ultimately boosting the economic expansion and national prosperity.

REFERENCES

Abdullah Al Hussain et al., "A Systematic Literature Review of Blockchain Technology Adoption in Bangladesh", Annals of Emerging Technologies in Computing (AETiC) Vol. 6, No. 1, 2022.

Al-Saqaf and Seidler N., "Blockchain technology for social impact: opportunities and challenges ahead", J. Cyber Policy 2, Volume 2, Issue 3, pp338–354, 2017.

IMF (International Monetary Fund), DEPARTMENTAL PAPERS, Powering the Digital Economy.

Islam, M.S., Karia, N., Mohamed Soliman, M.S., et al.: Adoption of mobile banking in Bangladesh: a conceptual framework. Rev. Soc. Sci. 2, 01, 2017.

Md. Mainul Islam Ron et al., "Adaptation of Blockchain Technology in the Mobile Banking System in the Context of Bangladesh", The Fourth Industrial Revolution and Beyond-Conference paper, pp. 427–443, 2023.

Md. Shihab Uddin Khan et al., "Artificial Intelligence in the Banking Sector of Bangladesh: Applicability and the Challenges", Published by Bangladesh Institute of Bank Management, Volume No. 6, Issue No. 2, 2021.

Mustak Ahmed, "Role of Artificial Intelligence in Bangladesh: Current Insights and Future Prospects", 14(4): 8-21, 2022; Article no.SAJSSE.87901, ISSN: 2581-821X, 2022.

National Strategy for Artificial Intelligence Bangladesh from 2019 to 2024, "AI for Innovative Bangladesh", pp. 1-53, 2019.

Syeda Nusrat, "Use of Blockchain Technology in Banking in Bangladesh; Usefulness, Hurdles and Recommendations", Electronic Research Journal of Social Sciences and Humanities, Vol 3, Issue 2, ISSN: 2706 – 8242, 2021

With the collaboration of ABB and pwc, "The Next Banking Evolution in Bangladesh driven by digital transformation", May 2023.

.

PROPOSITION OF STRATEGIES FOR BUSINESS MODELS THAT WORK IN SPORTS LEAGUE BUSINESS IN INDIA AND OTHER COUNTRIES

Saurav Kumar*

*Senior Faculty, Corporate Secretaryship Department, K.B Womens College,
Hazaribag, Jharkhand, India .
E-mail: saurav1980kumar@gmail.com

ABSTRACT

The sporting awakening in Asia is not just about China. Neighbouring India, the world's most populous country since April 2023, also offers a lot of business potential for the sports industry - and this is not limited to the all-powerful cricket. Diversity is growing, also thanks to new sports stars. In the run-up to the "India Sporting Goods Fair" trade show on March 19 and 20, 2024 in New Delhi, ISPO.com provides an analysis of the Indian sports market, with all the opportunities and risks. Young Indians in particular are so keen on exercise and the outdoors that experts are certain: Sport will be the next big industry in India. Gaurav Vazirani, national director of the New York media agency GroupM, therefore sees excellent opportunities for the future: "The Indian sports industry is ready for further growth and development (www.ispo.com). Compared to the West and China, the Indian sports market is characterized by many country-specific characteristics. Brands and companies that want to be successful here need to understand them and integrate them into their strategy. The Indian startup ecosystem has seen notable successes across multiple industries, and the sports sector is no exception. Over the past few years, several innovative startups from India have broken with traditional approaches and revolutionised the way sport is approached, consumed and experienced (yourstory.com/2023/05/). *The research aims to provide a detailed overview of sports league business in India and other countries and is also an attempt to reach the strategies for a cumulative sports league business model.*

Keywords: Indian sports, *sports league business.*

INTRODUCTION

The global sports market, comprising of infrastructure, events, training and manufacturing and retail of sports goods is estimated at INR37.8–44.2 lakh crore (USD600–700 billion), accounting for approximately 1 per cent of the global GDP(KPMG in India's analysis, 2016). Besides exercising a significant impact on the global economy due to its close association with other sectors, including education, real estate and tourism, the sector also contributes to

improvements in general health and wellbeing of a country. The Indian sports sector is experiencing a sea of changes with all-round developments initiated by the government, the private sector as well as non-profit organisations. The government is introducing game-changing schemes such as 'Khelo India' to address issues regarding infrastructure, talent scouting and training facilitation. Private sector and non-profit entities are also increasingly contributing to the sector by organising leagues and tournaments, funding talented sportspersons and getting involved in grassroots development. A thriving sports sector usually has significant socio-economic impact, as it is instrumental in improving the physical health and mental agility of a nation's human resources, and in promoting unity and national pride. In fact, sport as an industry contributes to about one to five per cent to the GDPs of various countries. The commercial success of Indian Premier League (IPL) in cricket has led to a surge of similar commercial formats in other sports such as badminton, football and hockey. International and domestic examples have shown that investment in sports has high potential tangible return on investment (RoI), albeit a long gestation period for commercial returns in case of league franchises, and has significant intangible RoI as well. The intangible RoI stems from increased brand awareness, brand building among target customers and increased brand loyalty through community engagement by utilising the mass medium of sports. ***This means that there is a requirement of more understanding of sports as a business unit and a very common or simple business model which could fit in for the investors.*** Indian sports are experiencing rapid commercialization. Leagues like the IPL and PKL have led to substantial revenue generation through broadcasting rights, ticket sales, and merchandise, making them lucrative platforms for brand investment. Example: The IPL's broadcasting rights deal with Star India for over $2 billion underscores the financial potential of sports leagues in India. A firm needs to have the ability to convert its resources and assets into competencies that create value (internal and external). Customers will not scramble to a firm's doors simply because the firm has modern resources and assets such as plants, geniuses, and patents. The firm has to use the plants, the geniuses, and the knowledge embodied in the patents to offer customers something they value. Patients do not buy patents or skilled scientists from pharmaceutical companies; they buy medicines that have been developed by skilled scientists using knowledge embodied in patents (von Scheel, Henrik & Rosenberg, Ann. ; 2010). Assets must be converted into something that customers want. A firm's ability or capacity to turn its resources into customer value and profits is usually called a competence or competencies. Competences

usually involve the use or integration of an organization's capabilities and resources/assets. Logic's ability to quickly turn its "cores" into products that customers want is a competence, which can be either core or non-core competencies. Intel's ability to develop microprocessors that exploit its copyrighted mircrocode and that are compatible with its installed base of microprocessors is a core differentiating competence. So is Coca-Cola's ability to turn its secret formula and brand into a product that many customers perceive as being preferable to its rivals' products (fuah, Allan & Tucci, Christopher. ; 2003). Business modeling provides a framework for organizing competencies by accountability level. By employing such a framework, executives can begin to envision how current business activities might function as an interlocking set of modules (von Scheel, Henrik & Rosenberg, Ann. ; 2010). Baden-Fuller and Mangematin (2013) argue that the essential characteristics of the business model, which they define as "a meta concept to exemplify firm strategy" (Baden-Fuller, C. & Haefliger, S., (2013) are customer, customer engagement, monetizaton and value chain and linking mechanisms. The rising interest in understanding and evaluating business models can to some extent be traced to the fact that new value configurations outcompete existing ways of doing business. There exist cases where some businesses are more profitable than others in the same industry, even though they apply the same strategy. This illustrates that a business model is different from a competitive strategy and a value chain (Nielsen, Christian & Lund, Morten. (2014). *The research aims to provide a detailed overview of sports league business in India and other countries and is also an attempt to reach the strategies for a cumulative sports league business model.*

SPORTS AS BUSINESS – LITERATURE REVIEW

Definition : A sport refers to a human activity involving physical exertion and skill. Sports may involve elements of competition or social participation, where rules and patterns of behavior governing the activity exist formally through organizations. The sports market consists of sales of sports services and related goods by entities (organizations, sole traders and partnerships) that offer spectator sports and participatory sports. Spectator sports include teams or clubs and independent athletes that present sporting events before a paying audience. Team owners of participants that enter competitive events or other spectator sport events, and sports trainers who provide specialized services to support participants in sports events or competitions are part of this industry. The establishments that operate race tracks are also

included in this industry. The sports market includes revenues generated by entities that provide live sporting events before a paying audience or entities that operate golf courses and country clubs, skiing facilities, marinas, fitness and recreational sports centers and bowling centers. Many people think that the sports industry solely comprises athletes, the training staff, and the team's general manager. However, that is not the case. There are many cogs in the form of businesses and organizations, which are essential to ensure that the sports industry runs smoothly. Often, retired athletes or even sports enthusiasts eventually tend to branch out, opening a business in this industry.

Market Size : According to a study on the global sports market, sales projections showed that this industry is set to reach a net worth of approximately $250 billion (www.asbn.com) soon. The global sports market reached a value of nearly $484,910.9 million in 2023, having grown at a compound annual growth rate (CAGR) of 3.6% since 2018. The market is expected to grow from $484,910.9 million in 2023 to $651,007.0 million in 2028 at a rate of 6.1%. The market is then expected to grow at a CAGR of 5.8% from 2028 and reach $862,585.5 million in 2033. The top opportunities in the sports market segmented by type will arise in the participatory sports segment, which will gain $92,006.9 million of global annual sales by 2028. The top opportunities in the sports market by revenue source will arise in the media rights segment, which will gain $55,932.3 million of global annual sales by 2028. The top opportunities in the sports market by ownership will arise in the standalone segment, which will gain $100,327.5 million of global annual sales by 2028. The sports market size will gain the most in China at $39,701.1 million (www.thebusinessresearchcompany.com).

Overview : Dilwyn Porter (2010) has surveyed two centuries of sports entrepreneurship history, using examples from the United States, Britain, and Europe. He argues that sports have always had a connection with business but that this has changed over time, and now, at the elite level, there is a greater tendency to define themselves primarily as businesses. In particular, he notes that in British team sports, coincident with the decline of amateur hegemony, profit has become much more of a driving force than the traditional focus on utility-maximization. He also suggests that comparisons with other branches of the entertainment industry would help place developments in sport into perspective. The late John Lowerson (Manchester: Manchester University Press, 1995) presented a British study of late Victorian and Edwardian sports entrepreneurs that looked at those involved in both the spectator product and the player

product. He outlined the economic history of firms such as Hardy's (Philadelphia: Temple University Press, 1990) (high-class angling equipment), Jacques (lawn bowls and croquet equipment), and Slazengers' (tennis balls) as well as looking at company formation among golf and tennis clubs. Additionally, Wray Vamplew (Cheltenham: Edward Elgar, 2016) has presented a typology of the development of work-based teams and facilities across a range of sports, which significantly often offered a degree of equality for women. Andrew Ross (Chichester: Wiley Blackwell, 2014), in a sweeping yet solid survey of the American literature on sports business history in Steve Riess's Companion to American Sport History, presents American sports entrepreneurs as yet another case of American exceptionalism. He argues that American sports entrepreneurs, unlike those elsewhere, are more market-driven and more profit-focused. *Few have considered 'the multiple business opportunities for the entrepreneur outside of the sports realm that are made available through the entrepreneur's connection to sport.* (New York: Palgrave Macmillan 2014) Administrators in Australia sought to popularize their sport by creating a network of clubs and promoting competition amongst them as well as bringing overseas stars to Australia, neither of which fell within the classic British view of amateur sport under whose policies they were supposed to be operating. Instead, they replicated the practices adopted by entrepreneurs pushing professional sport. John Chi-Kit Wong has shown that elite-level amateur ice hockey in Canada was operating on a business-like model before any actual professional hockey governing bodies appeared on the scene (Toronto: University of Toronto 2005). *Universities worldwide are dedicated to teaching, learning, and research on sports enterprise.*

Jang et al. (2020) was to identify consumer groups through consumer segmentation in the exponentially growing esports industry. The study focused on "game experiences" in the context of esports gameplay consumption. They developed a matrix of esports gameplay based on high/low esports gameplay, viewing esports, and hardware enthusiasm leading to four esports gameplay consumer groups: all-around gamer, conventional player, observer, and recreational gamer. The proposed esports consumers' clustering is an example of research that will contribute to mapping and defining one of the world's fastest growing sport business sectors.

Foster et al. (2020) have responded to the growing demand for data analytics talent in (elite) sport organizations. As hiring analytics talent is critical, applicants can command high levels

of compensation, in part because they are attractive to companies in many other industries. One of the implications of this broader adoption of analytics across elite sports clubs, will be a greater emphasis on continued innovation across many areas such as player squad assembly, pre-game and within-game strategy, and health and fitness. A further implication is that executive talent from outside of professional sport is increasingly more relevant and valuable to the sport industry. In the near future, the demand (and hence competition) for off-the-field talent in sport business will increasingly intersect with other industries, opening opportunities for cross-pollination and innovation beyond the boundaries of the sport industry.

Jackson and Dawson (2021) reflect on the meaning, value and significance of sport. They introduce the challenges facing the global business of sport and describe the privileged position of sport in society, as "sporting exceptionalism." They then use the example of women's professional sport to illustrate three key steps for an alternative future, while also signaling risks associated with following a hegemonic male model of consumer capitalist sport. They conclude that the more dominant or hegemonic any existing social system is (including sport), the more difficult it is to consider alternative futures. However, there lies tremendous potential value in applying the concept of alternative futures to envisioning a direction for the sport industry. It allows necessary contemplation about new structures, policies, and programmes that will positively transform global sport business.

Chmait and Westerbeek (2021) look at how artificial intelligence has transformed the way in which sport is consumed and analyzed. In this perspective paper, the authors present a high-level, non-technical, overview of the machine learning paradigm that motivates its potential for enhancing sports (performance and business) analytics. Founded on a summary of relevant research literature in areas where artificial intelligence and machine learning have been applied to the sport industry, they present some hypothetical scenarios of how artificial intelligence and machine learning could shape the future of sports. They conclude their work with ominous questions. Will artificial intelligence 1 day be shaping the spending behavior of sports fans by exploiting their fan infused emotional vulnerabilities? Or if indeed, artificial intelligence will sacrifice the health of some athletes in favor of the bigger team winning the championship?

Jenkin et al. (2021) focus their attention on the rapidly growing, but largely ignored market segment of older adults as sport participants. They investigated how managers in Australian National and State Sporting Organizations perceive sport for older adults. Contextualized in

the perspective of organizational change, a framework for marketing to the aging consumer was used to interpret the results. They found that older adults are not a high priority group for most sporting organizations, despite recognition of the benefits of engaging older adults. A lack of age-appropriate programmes was perceived to be a major barrier of engaging older adults. Across all sporting organizations there was broad agreement that increasing participation numbers and engaging the older fan base was important, but most sporting organizations are not (yet) ready to build "age friendly" sporting environments. The study provided insights into why this untapped market is not a priority target, and offers policy makers directions to better engage with this population group.

Business Models Significance: In layman's terms, a business model is the sum of the parts comprising an organization's products or services. Establishing these models requires a combination of developing new offerings, finding untapped markets, and disrupting the organization by discovering different ways to market. Looking at the most innovative sports business models brings to light how the rise of digital platforms and technologies transformed the fundamental behaviors, wants, and needs of people. Compared to past generations, humans consume content and communicate in a completely different way. The change is encapsulated best by Nike CEO Mike Parker's quote (www.collectivecampus.io) saying, "We used to sell you a pair of shoes and some advertising, now it's about building a relationship." Across the whole of the value chain, the future of sport business will be as much determined by advancements in artificial intelligence, machine learning and sophisticated (fan and performance) data analytics *as it will be through application and sourcing of new business models*, tapping new markets, creating alternative revenue streams, management approaches such as alternative futures scenarios, and developing strategic partnerships beyond the sport industry (Westerbeek H, et. al 2022). A *few sport management studies refer explicitly to business models* as devices that firms use to mediate technology development and economic value creation (Chesbrough, H., & Rosenbloom, R.S. 2002) or blueprints that map relationships among firms' customers, allies, and suppliers to enable product, information, and money flows (Chelladurai, P. 2013), (Weill, P., & Vitale, M. 2002). Aversa et al. (2015), for instance, in the context of professional sport, conclude that Formula 1 race teams build on two complementary business models: one focused on selling technology, the other on selling well-trained human resources to competitors.

SPORTS BUSINESS MODELS IN INDIA & OTHER COUNTRIES

The main modes of private investment and private sector association with sports include:

• **Non-profit:** These include CSR initiatives and investments in the sector by leading corporate houses, and non-profit foundations. These foundations are chiefly involved in providing opportunities to children from the under-privileged sections to take up sports, supporting promising sportspersons in accessing worldclass training facilities and developing sporting infrastructure.

• **For profit:** This pertains to the commercial interests in the sports sector, and covers the entire spectrum of sports goods manufacturing, retailing, establishing sports academies, providing sports curriculum services to schools and colleges, owning leagues and franchises, player management agencies, media houses, infrastructure development companies and other companies that seek marketing avenues for their brands through sponsorship association with sports tournaments and players.

In India, non-profit association with sport is more common. For-profit investment in sport in India mainly includes sponsorships and owning leagues and franchises. The commercial success of Indian Premier League (IPL) in cricket has led to a surge of similar commercial formats in other sports such as badminton, football and hockey. Reasonable success of the Indian Badminton League (IBL) and the Hockey India League (HIL) — sports that don't enjoy the same popularity as cricket, has shown that leagues are a good medium for generating interest and driving sports culture besides the potential RoI. These leagues may therefore not only benefit their respective sport monetarily, but also boost their uptake in the country.

SPORTS ECOSYSTEM OF INDIA

Sports ecosystem comprises different dimensions or segments that go into establishing and developing a sport and various stakeholders in each segment. The evolution of a sports ecosystem may be evaluated by the extent of interaction and awareness among stakeholders, within and across various segments. The levels of transparency and professionalism of the

system, coupled with growing awareness of all stakeholders, decide the extent of the sports ecosystem's evolution. Identifying key stakeholders and addressing their issues and challenges is likely to go a long way towards strengthening the sports ecosystem in India. While the sports ecosystem is largely driven by the Government and Government-run bodies currently, the role of private sector stakeholders is on a rise and can be crucial to get the desired momentum:

• **Sports governance:** The role of private sector in sports governance is limited. However, there are instances of private sector deals with sports federations for overhauling/ improving the respective sport. Such deals provide the usually cash starved National Sports Federations (NSFs) a financial breather to go about implementing plans for their respective sport's improvement.

• **Talent scouting and training players and trainers:** There is a reasonable presence of private academies being run on a self sustainable basis by former players of various sports. These academies try becoming sustainable by saving on capital expenditure through levers such as leasing playgrounds from schools and government institutions, rather than owning space. There is also a significant presence of leading corporate houses through their CSR initiatives, and non-profit foundations in the talent scouting and training players segment. Sports coaches and trainers are primarily trained in Government-run institutes. There are some private universities as well that offer courses in sports, physical education and other sports-related sciences, albeit on a limited scale. Private sector contribution in this segment is also seen by way of certain academies that provide active consultation to the Government in addressing the skill gap in sports coaching in India, and through private academies and sporting leagues that appoint a foreign coach who in turn shares expertise with Indian coaches.

• **Infrastructure:** Private sector contribution to sports infrastructure is minimal and is limited to PPPs for sports infrastructure development and operation. Some non-profit efforts towards stadia development have also been witnessed, but they are limited in number.

• **Sports equipment industry:** Key stakeholders in this industry are equipment manufacturers, retailers, consumers, and private sports academies. While India is a major exporter and manufacturing hub of certain sports goods, importing equipment for some non-popular sports significantly increases their cost.

• **Leagues and tournaments:** Key stakeholders involved in this segment are broadcasters, franchises,

National Sports Federations (NSFs), sponsors and spectators. The role of broadcasters and league owners in designing a spectator-friendly format becomes crucial to the commercial success of leagues, for instance the IPL, HIL, etc.

• **Performance incentives:** Central and state Governments provide a majority of performance incentives to sportspersons in the form of government and PSU jobs, pension funds, educational scholarships and cash endowments. The role of private players is currently limited, but it is emerging gradually with the advent of non-profit foundations providing athlete sponsorships, and sports consulting firms that help athletes with post-retirement planning. Though private players are involved in various capacities in the sports ecosystem, the business of sports in India continues to be at a nascent stage. Investing in leagues has become an important for-profit mode of entering the sports sector. However, profitability in the league format has also been a concern especially for non-cricketing sports leagues that elicit little interest from broadcasters due to inadequate spectator base — considering the fact that media rights is one of the biggest sources of league revenue.
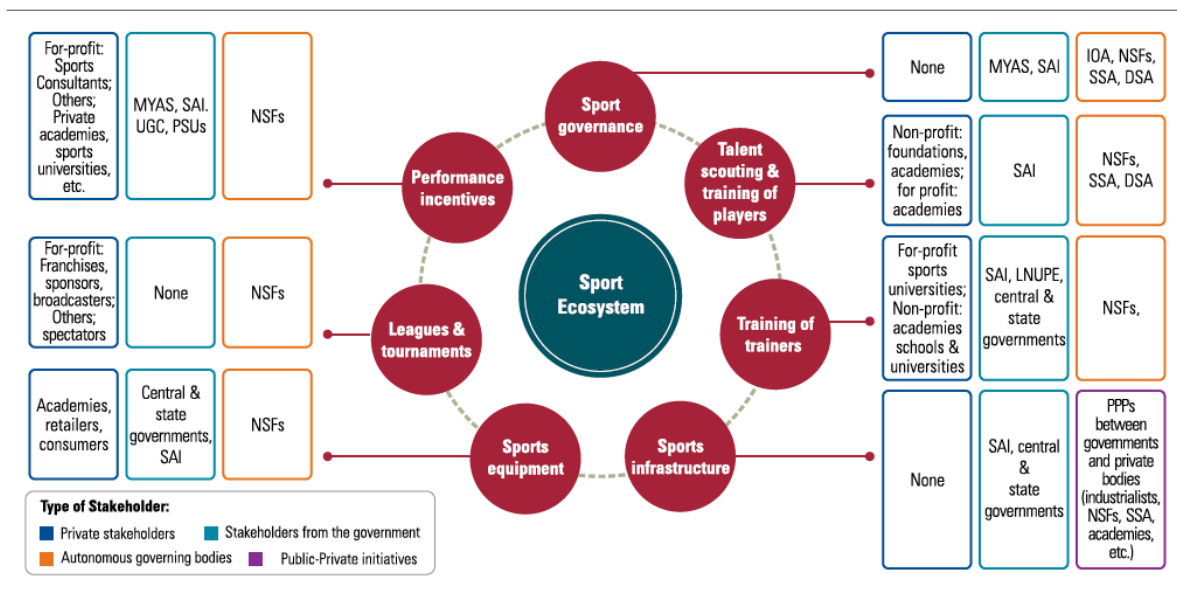

FIGURE 1:- Stakeholders in Indian sports (source: kpmg)

Leagues and tournaments

Globally, the leagues system has served as an important way for companies to enter the sports sector. A sports league creates several opportunities for private companies in domains such as league management, franchisee, broadcasting, advertising, infrastructure, player management, licensing and merchandising. US alone is home to some of the biggest leagues in the world such as the National Football League (NFL), Major League Basketball (MLB), National Basketball Association (NBA) and National Hockey League (NHL), setting an example for ways of monetizing sports. For any league, media rights, sponsorships and revenue from franchises constitute major sources of revenue.

Commercial viability of leagues in India

The commercial viability of any league in India is governed by certain critical success factors, such as:

• **Players:** Involvement of the top players of the world creates interest among viewers and improves the quality of the game. IPL and IBL are some successful examples. On the other hand, I-League is struggling to attract top players, resulting in poor viewership.

• **Marketing:** An effective marketing campaign is another critical factor in increasing a league's popularity. Again, involvement of various celebrities as brand ambassadors or owners in IPL contributed to increased viewer interest in the league. In fact, the collaboration of the Indian entertainment industry and cricket has aided in making the IPL a commercial success.

• **Governance framework:** It has been witnessed that leagues that with support from the approved federation have been able to sustain. ICL failed due to lack of support from the BCCI, and WSH is facing similar troubles due to the non-recognition of the founding federation as the official national sports federation of hockey.

• **Stadium infrastructure:** Quality of stadium infrastructure contributes to the viewing experience, which increases the level of interest in sports. This, in turn, leads to an increase in the value of media rights.

• **Fan base:** An effective strategy to increase a franchise fan base is the engagement of respective franchisees with the local community. This helps generate greater TV viewership, increases attendance in matches and sale of merchandise.

• **Performance of national team or players at the international level** increases interest in the game and, consequently, the league.

• **League timing:** The tournament should be held at a time when: – No international tournament is being organised simultaneously that can divert a significant section of the viewers

– Maximum players are available

– The weather is suitable for holding matches.

The length of games and timing of matches are also some other important factors, as gathered from the IPL experience.

Case study 1: The launch of the Japanese J-League (www.j-league.or.jp)

Japanese football was in disarray until the late 1980s and in need of reform: the quality of play was low and low attendance figures confirmed people's disinterest in the sport. A series of re-organisational actions resulted in the launch of the Japanese J-League. The founders (the Japanese Football Association) in 1991 had three significant primary goals in mind:

• Improve the quality of the game;

• Develop a sporting culture;

• Earn international recognition.

The J-League was incorporated as an autonomous, non-profit organisation, unlike the English Premier League, in 1992, as a limited company. However, it is different from European football in the sense that its management is centralised, which implies that the J-League — not the clubs — makes decisions concerning sponsorships and licenses for the league. The goal was to create equal financing opportunities for every club (it was doubtful whether each club would be able to survive on its own from the beginning, because of low interest in football). The fact that all teams are highly competitive further enhanced the league's popularity. Currently, there are 36 corporate sponsors of the league and, by extension, of the clubs. This number includes large multinational companies. They usually compete with each other to acquire the status of teams' preferred supplier for different services. There are, however, no public funds used in professional football. The biggest challenge the founders faced was the lack of an established

base of football in Japan. Sumo and baseball were far superior; only a few children took up football as their sport. Naturally, the limited number of players lowered football standards in the country. However, to turn this around, J-League clubs were required to go beyond being football teams and serve as community centres. Modelled after the German professional clubs, Japanese teams are comprehensive sport clubs that provide entertainment to people of all age groups. They are also tasked with promoting sports in their region and with encouraging people to participate in local sporting initiatives. To further increase public support, the teams tried to connect with their respective local communities. First of all, every participating club was renamed after its home city. Since the base city of a team cannot be changed, the naming process helped in creating a mutual commitment between a club and the locals. Every club is required to operate teams at various levels, such as under 18, under 15 and under 12. This motivates — and creates opportunities — for children to play football. Several other initiatives were taken to make the sport more spectator friendly and exciting for the Japanese consumers. The first official season (1993) started with 10 clubs (later it was expanded to 18 teams). The league adopted a two-stage season system where the winners of each stage played a final play-off at the end of the season to determine the champion. Moreover, matches could not end in a tie after 90 minutes. In case of levelled scores after the time limit, a 30-minute extra time game commenced, followed by a penalty shoot-out (if required). The system reverted to 'classic' rules in 1999 with a one-stage league format and the possibility of ties. There are plans to revive the two-stage format in 2015. To improve the quality of the game and increase attendance, the J-League invited foreign football stars to the teams. Among others, Gary Lineker, Dunga, Jorginho, Patrick M'Boma and Dragan Stojkovic arrived in the early years for wages reportedly as high as JPY300 million (USD 3 million) a year. Numerous foreign coaches were also employed, such as Arsene Wenger (the current manager of the EPL team Arsenal). The J-League's embracing of the European best practices and systems helped it quickly improve the quality of the games. However, their reliance on big names was shortlived once domestic players started establishing themselves. Today, the earlier trend seems to have reversed with Japanese footballers playing for major European teams (Shinji Kagawa for Manchester United and Yuto Nagatomo at Inter Milan are a few examples). Building fan bases and creating a culture of football were also important. The J-League aimed at reaching out to people with diverse backgrounds and interests. Hooliganism was kept at bay to ensure people can enjoy the games with their families. Singing and chanting during the games was encouraged to create a

good atmosphere. The league contracted a leading global creative agency to rebrand the teams and enhance their appeal among fans. Mascots and logos became an integral part of teams' identity, further reinforcing the bond between fans and clubs. Bright and eye-catching kits with high recall value were also introduced. Like major American sports, significant focus was given on developing a variety of merchandise. The launch of the J-League proved to be a commercial and sporting success. Well-planned commercial and merchandising activities, which leveraged communal and regional pride, resulted in the creation of a strong fan base. Interest in the sport rose steadily with average attendance reaching as high as 18,000 per game. Football gradually became one of the most popular sports in Japan, since the J-League provides the country with a domestic alternative to the English Premier League, which usually overshadows domestic football. Moreover, it also helps Japanese players in showcasing their talent and rising to the top without being forced to play for other countries' clubs. Thanks to the J-League, participation in football boomed in the country and currently about 5 million people are estimated to play professionally or at the amateur level.

Case study 2: UK Premier League broadcast exports reflect its significant international appeal

The Premier League's broadcast exports comprise almost half of the UK's TV exports. In 2019/20, the League's broadcast exports were £1.4 billion, almost on par with the £1.5 billion achieved in exports of other UK television productions (including the BBC, ITV, Channel 4, Channel 5, Sky and the independent sector) in 2019/20 (PACT). The Premier League's overseas broadcast rights have consistently exceeded the combined total of the other four major European leagues. Broadcast export value is supported by the Premier League's investment in Premier League Productions (PLP), which distributes and creates content for international rights holders.

Premier League
Bundesliga, La Liga, Ligue 1 and Serie A combined

115
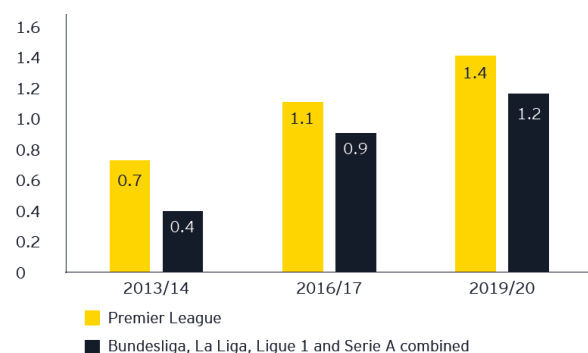
FIGURE 2:- Overseas rights of major sports leagues, £ billions (source: Premier League analysis estimates)

RESULTS & FINDINGS

Business Strategies Behind the Most Profitable Sports Leagues:-

A.) Building a Global Brand

In today's interconnected world, reaching beyond national borders is crucial. The National Football League (NFL), considered one of the most profitable sports leagues globally, with an estimated worth of $86 billion as of 2023, is a prime example. Their international expansion strategies include:

- **Establishing offices in key markets**: The NFL has offices in London, Mexico City, and China, focusing on marketing, partnerships, and fan engagement.

- **Playing regular-season games internationally**: The "NFL London Games" series, which started in 2007, attracts millions of viewers globally, showcasing the league's brand and generating significant revenue.

- **Content creation and broadcasting**: The NFL has partnered with international broadcasters and streaming services, like DAZN and Amazon Prime Video, ensuring global accessibility to their content.

Roger Goodell, NFL Commissioner, stated in 2023, "We are committed to growing the NFL internationally and making it a sport that is truly global."

This commitment to internationalization allows the NFL to tap into new markets, expand its fanbase, and ultimately, increase profitability.

B.) Cultivating a Loyal Fanbase

Engaging fans is paramount for any sport. Leagues achieve this through various means, including:

- **Enhancing the game-day experience**: From introducing interactive elements like in-stadium games and giveaways to creating a comfortable and family-friendly environment, leagues make attending games an enjoyable experience for all.

- **Building a strong online presence**: Social media platforms and dedicated apps allow for constant fan engagement, providing behind-the-scenes content, player interaction opportunities, and personalized experiences.

- **Developing community initiatives**: Leagues often participate in charity drives, youth programs, and community events, fostering a sense of connection and loyalty with the local community.

The Indian Premier League (IPL), the world's most valuable cricket league with a brand valuation of $8.4 billion in 2023, excels at fan engagement. Its success can be attributed to:

- **Focusing on high-octane entertainment**: The IPL's shorter format, fast-paced action, and focus on entertainment make it a captivating experience for fans, attracting a wider audience.

- **Investing in digital reach**: The IPL has a strong online presence, with millions of followers on social media and a dedicated app offering real-time updates, highlights, and exclusive content.

- **Leveraging regional identities**: By associating each team with specific Indian cities, the IPL fosters a sense of local pride and connection among fans.

These strategies not only create a dedicated fanbase but also translate into increased ticket sales, merchandise purchases, and viewership, leading to higher revenue streams.

C.) Sponsorship and Advertising

Sponsorships are a significant source of income for sports leagues. Leagues like:

- **The National Basketball Association (NBA)**: With a partnership revenue of $1.5 billion in 2022, the NBA which is one of the most profitable sports leagues has secured lucrative deals with major corporations like Nike and Microsoft.

- **The English Premier League (EPL)**: Its lucrative kit sponsorship deals, with shirt sponsorship alone generating over $700 million annually, highlight the league's financial strength.

Leagues attract sponsors by:

- **Offering valuable brand exposure**: Sponsorships provide companies with access to a large, engaged audience, enhancing their brand visibility and recognition.

- **Providing activation opportunities**: Leagues offer sponsors various opportunities to activate their partnerships, such as in-stadium branding, product sampling, and media integrations.

- **Tailoring packages**: Leagues offer sponsorship packages catering to different needs and budgets, ensuring inclusivity and attracting a wider range of partners.

Adam Silver, NBA Commissioner, stated in 2022: "Our sponsorships are integral to our league's growth and success, allowing us to invest in our players, teams, and the game itself."

By strategically leveraging sponsorships, leagues not only generate substantial revenue but also build strong relationships with key partners, fostering long-term stability and growth opportunities.

D.) Innovation and Technology

Technological advancements play a crucial role in sports leagues' success. Leagues are adopting innovative solutions such as:

- **Utilizing advanced analytics:** Data analysis helps sports leagues understand fan preferences, optimize game schedules, and improve player performance, leading to better decision-making and increased efficiency. For instance, leagues can analyze fan attendance patterns to determine optimal start times for games, or they might use performance data to identify areas for player development, draft decisions, and even reduce potential injuries. This type of data-driven approach allows leagues to make informed decisions that impact both the fan experience and the success of their teams, ultimately improving the league's overall health and long-term profitability.

- **Enhanced broadcasting experiences**: Technologies like virtual reality and augmented reality offer new ways to engage fans, providing immersive experiences and driving viewership.

- **Evolving digital platforms**: Leagues are constantly innovating their digital platforms, offering streaming services, interactive features, and personalized content, catering to the evolving needs of fans.

By embracing technology, leagues can:

- **Increase fan engagement**: Technological advancements create new and exciting ways for fans to interact with the sport, leading to a more engaged and loyal fanbase.

- **Generate new revenue streams**: New technologies can open doors to new revenue opportunities, such as selling exclusive digital content or offering pay-per-view events.

- **Improve operational efficiency**: Technology helps streamline operations, manage resources effectively, and make data-driven decisions, leading to cost savings and increased profitability.

E.) Broadcasting Rights

Broadcasting rights are another major source of revenue for sports leagues. Leagues:

- **Negotiate lucrative deals**: Leagues negotiate exclusive broadcast rights with various broadcasters, ensuring they receive the highest possible compensation for their content.

- **Explore different models**: Leagues are exploring different broadcasting models, such as over-the-top (OTT) streaming services and pay-per-view options, catering to diverse audience preferences.

- **Invest in content production**: High-quality content production is crucial for attracting viewers and securing lucrative broadcasting deals.

With its centralized broadcasting rights model, the **German Bundesliga** is an example of successful rights management. This model ensures that all clubs receive a share of the revenue generated from broadcasting rights, promoting financial stability and competitiveness within the league.

Donata Hopfen, the previous CEO of the DFL (German Football League), stated in 2023: "Our centralized broadcasting rights model has been instrumental in ensuring the financial stability of the Bundesliga and contributing to its growth and success on a global scale."

Through effective management of broadcasting rights, leagues can generate significant revenue, ensure financial stability for their members, and reach a wider audience, further amplifying their global reach and profitability.

The success of a sports league is not solely determined by on-field competition but also by its strategic approach to business operations. By implementing the strategies outlined above, leagues can build a strong global brand, cultivate a loyal fanbase, leverage partnerships, embrace technology, and navigate the complexities of broadcasting rights, ultimately achieving long-term financial sustainability and paving the way for continued growth and success in the ever-evolving world of sports.
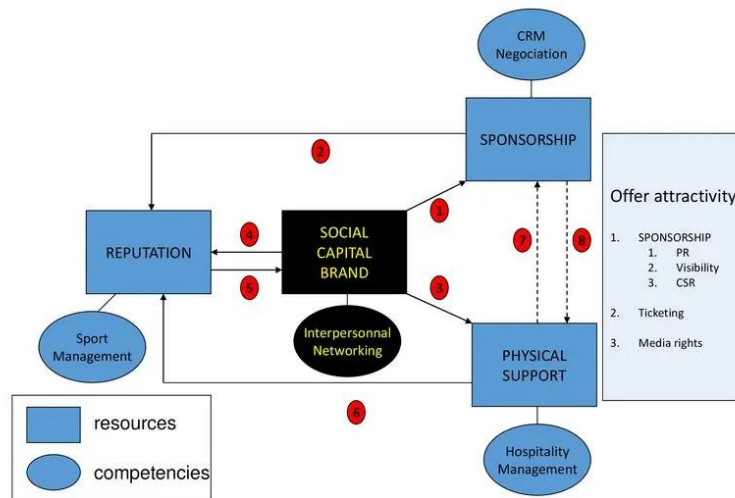
CONCLUSION

Therefore, the research analysis observed in the business models that currently exist in the sports business industry;

The Relational Model

This model relies on personal networks to attract funding partners for their club or event. Partners can be communities or private companies. This strategic base configures sports organizations that do not have significant TV rights, so the resource of a company or community proportionally replaces what represents the TV right for a major sports event.
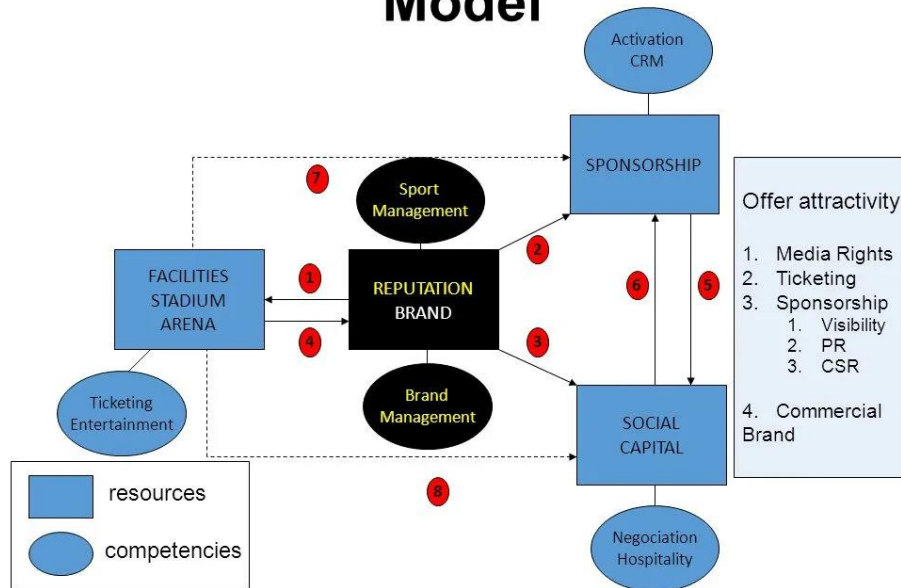
FIGURE 3: RELATIONAL BUSINESS MODEL

Relational asset makes the brand capital more attractive. The main partnership contracts-economically attracts the athletes and the sports management part .This sum of money finances the costs of facilities and hospitality in sports venues and new relations by reputation effect the new partnerships in the context of the evolution of physical supports associated with the events.

The Reputation Model

The model of big sports events and clubs or leagues financed mainly by TV rights. The configuration is centred on the reputation capital which attracts media partnerships thanks to the sporting exceptionality. Non-media partnerships aim to develop their own brand through media exposure.

This is the model for major events such as the Olympic Games, the Football World Cup, Roland Garros, etc. They attract attention both through their sporting rank but also through media promotion.
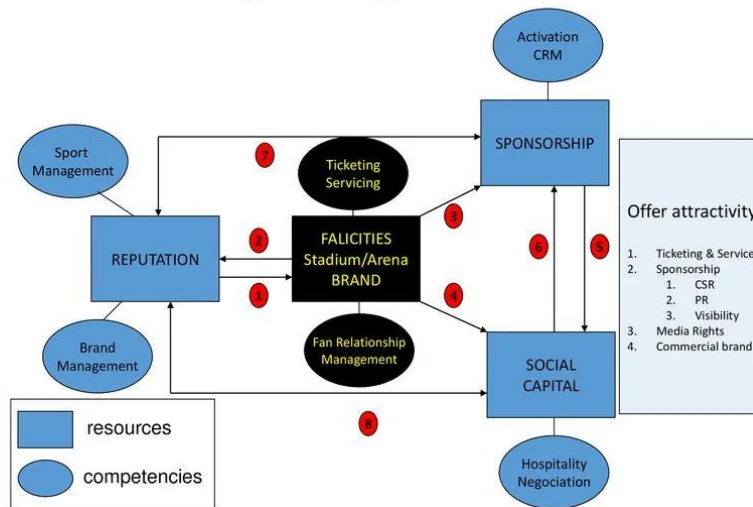
FIGURE 4: REPUTATIONAL BUSINESS MODEL

The Fan Relationship Management Model

This is the business model that places their physical support at the base of their economy. In the case where the club or event owns and operates its sports arena, the latter is the source of revenue directly (sale of tickets or services and derivative products within the stadium).

The sports organisation establishes a dynamic relationship with its fans and businesses through its physical support. Then media and non-media partners are activated by the media and relational potential. These feed the reputation of the club or event.

FIGURE 5: FAN RELATIONSHIP MANAGEMENT BUSINESS MODEL

REFERENCE

Andrew Ross, 'Explaining Exceptionalism: Approaches to the Study of American Sports Business History', in Steven A. Riess, *A Companion to American Sport History* (Chichester: Wiley Blackwell, 2014), 523–551. Incidently, because he used a slightly modified version published in a collection, Ross dates Hardy's seminal article at 1997 rather than the original 1986.

Aversa, P., Furnari, S., & Haefliger, S. (2015). Business model configurations and performance: A qualitative comparative analysis in Formula One racing, 2005–2013. *Industrial and Corporate Change,* 24(3), 655–676.

Baden-Fuller, C. & Haefliger, S., (2013), Business models and technological innovation. Long Range Planning, Vol. 46, No. 6, pp. 419-426

Chmait N and Westerbeek H (2021) Artificial Intelligence and Machine Learning in Sport Research: An Introduction for Non-data Scientists. *Front. Sports Act. Living* 3:682287. doi: 10.3389/fspor.2021.682287.

Chesbrough, H., & Rosenbloom, R.S. (2002). The role of the business model in capturing value from innovation: Evidence from Xerox Corporation's technology spin-off companies. *Industrial and Corporate Change,* 11(3), 529–555.

Chelladurai, P. (2013). A personal journey in theorizing in sport management. *Sport Management Review,* 16(1), 22–28.

Dilwyn Porter, 'Entrepreneurship' in S.W. Pope and John Nauright (eds), *Routledge Companion to Sports History,* (Abingdon: Routledge, 2010), 197–215.

Erik Nielsen, *Sport and the British World, 1900–1930: Amateurism and National Identity in Australasia and Beyond* (New York: Palgrave Macmillan 2014).

fuah, Allan & Tucci, Christopher. (2003). A Model of the Internet as Creative Destroyer. Engineering Management, IEEE Transactions on. 50. 395 - 402. 10.1109/TEM.2003.819651.

Foster, G., O'Reilly, N., and Davila, A. (2020). *Sports Business Management: Decision-Making Around the Globe, 2nd* Edition. Routledge (New York, NY; London: Taylor & Francis). doi: 10.4324/9780429340536-2.

https://www.ispo.com/en/sports-business/sport-india-cricket-country-sports-nation.

https://yourstory.com/2023/05/indian-sport-startups-games-industry-esports-technology-innovation.

https://www.asbn.com/start-a-business/entrepreneurship/25-small-business-ideas-for-athletes-and-sports-lovers/

https://www.thebusinessresearchcompany.com/report/sports-market

https://www.collectivecampus.io/blog/business-model-innovation-in-sports#google_vignette.

http://www.j-league.or.jp/eng/, KPMG in India Analysis

"India Sports Equipment Industry Outlook to FY'2018", Ken Market Research, May 2013.

John Lowerson, *Sport and the English Middle Classes 1870–1914* (Manchester: Manchester University Press, 1995), 225–60.

John Chi-Kit Wong, *Lords of the Rinks: the Emergence of the National Hockey League 1875–1936* (Toronto: University of Toronto 2005).

Jang, W. W., Byon, K. K., Baker, T. A., and Tsuji, Y. (2020). Mediating effect of esports content live streaming in the relationship between esports recreational gameplay and esports event broadcast. *Sport Busin. Manage*. 11, 89–108. doi: 10.1108/SBM-10-2019-0087.

Jackson SJ and Dawson MC (2021) The Global Business of Sport in a Brave New World: Conceptualising a Framework for Alternative Futures. *Front. Sports Act. Living* 3:673178. doi: 10.3389/fspor.2021.673178.

Jenkin C, van Uffelen JGZ, O'Sullivan G, Harvey J, Eime RM and Westerbeek H (2021) Marketing Up the Wrong Tree? Organisational Perspectives on Attracting and/or Retaining Older Adults in Sport. *Front. Sports Act. Living* 3:772361. doi: 10.3389/fspor.2021.772361.

Nielsen, Christian & Lund, Morten. (2014). An Introduction to Business Models. SSRN Electronic Journal. 10.2139/ssrn.2579454.

Stephen Hardy, '"Adopted by all the Leading Clubs": Sporting Goods and the Shaping of Leisure', in Richard Butsch (ed.), *For Fun and Profit: The Transformation of Leisure into Consumption* (Philadelphia: Temple University Press, 1990), 71–101.

Sports Retailing in India: Opportunities, Constraints and Way Forward", INDIAN COUNCIL FOR RESEARCH ON INTERNATIONAL ECONOMIC RELATIONS, June 2010.

UK TV Exports Report — PACT.

von Scheel, Henrik & Rosenberg, Ann. (2010). The Importance of a Business Model.

"Winning in the Business of Sports", A.T. Kearney, 15 February 2014, KPMG in India's analysis, 2016.

Wray Vamplew, 'Workers' Playtime: Developing an Explanatory Typology of Work-Associated Sport in Britain', in John Wilson and Richard Pomfret (eds), *Sports Through the Lens of Economic History* (Cheltenham: Edward Elgar, 2016), 106–27.

Westerbeek H, Eime R, Karg A and de Bosscher V (2022) Editorial: The Future of Sport Business. *Front. Sports Act. Living* 3:839520. doi: 10.3389/fspor.2021.839520.

Weill, P., & Vitale, M. (2002). What IT infrastructure capabilities are needed to implement e-business models? *MIS Quarterly Executive,* 1(1), Article 17.

THE ROLE OF MANAGEMENT INFORMATION SYSTEMS (MIS) IN TELECOMMUNICATION SECTORS IN BANGLADESH

Dr. Gopal Chandra Saha*, Saptarshi Chakma**, Rafsan Jany***, Aditi Roy****

*Associate Professor & Head Department of Business Administration School of Business, Ranada Prasad Shaha University, 25, Shitalakhya, Narayanganj, Bangladesh

** Assistant Professor, Master of Business Administration (MBA), Department of Management, Rangamati Science and Technology University, Bangladesh

*** Lecturer, MS in Statistics (DU) Department of Business Administration, R.P. Shaha University, Narayanganj-1400, Bangladesh

**** Lecturer, Master of Business Administration (MBA), Department of Business Administration R. P. Shaha University, Narayanganj-1400, Bangladesh

Email: gopalsaha_ru@yahoo,com

Shaptarshi@rmstu.ac.bd

rafsanjany980@gmail.com

roy11394@gmail.com

Cell No- +88-01712627091

Abstract

Any organization that strives to provide its users with quick access to complete, understandable, and reliable information should have a Management Information System (MIS). Information systems for management assisted in the automation of tasks. Automation can improve organizational workflow, save time, money, and resources, and minimize the number of employees. It raised customer happiness, labor efficiency, productivity, and effectiveness within the firm. MIS, in general, allows information to be gathered, processed, and stored by telecommunication sectors with the ultimate goal of making that information available on demand in the necessary format. Because the telecommunications industry has millions of users and manual data storage would be difficult, MIS is required for these industries to operate (using files). Through a combination of information from the literature and interviews with specific telecom company employees in Bangladesh, this research article seeks to illustrate the concept of MIS and its role in the country's telecom industries. In order to gather information about how MIS is used in the organizations of the 100 respondents who completed a standardized questionnaire, descriptive statistics were examined in addition to secondary data. This study also looks at the connection between organizational performance and MIS. This study indicates that to regulate

telco industries more efficiently, MIS helps to gather, store, process, and retrieve data more effectively.

Keywords: Role of MIS, Telecommunication Sectors, and Organizational Performance Management Information System, MIS

1. Introduction

Bangladesh has one of the highest populations in the world, but its information and communications infrastructure is not up to par with many Asian nations. However, numerous organizations in Bangladesh, including banking, telecommunications, government offices, and universities, rely on MIS. These systems are crucial for optimizing workflows, raising productivity and efficiency levels, and enhancing overall performance.

The significance of MIS stems from its ability to provide timely and useful information, boost labor productivity, reduce costs, ensure accurate and prompt information delivery, and enhance work management. Telecommunication sectors in Bangladesh extensively utilize various types of information systems software such as like marketing information system, accounting information systems, human resource information systems or HRIS, and customer relationship management ystems or CRMS. Among these, Human Resource Information Systems and Customer Management Systems are particularly prevalent, containing essential employee and customerrelated information, respectively.

Given the critical dependence of telecommunication sectors on MIS, understanding their role is paramount. MIS aids in managing, organizing, and retrieving information, thereby facilitating quicker service delivery, more accurate market insights, and ultimately, improved organizational performance. This study's goal is to explore the utilization of MIS and its impact on organizational performance within the telecommunication sector.

2. Literature Review

Accelerated by technical improvements and rising demand for connectivity, Bangladesh's telecommunications sector has seen substantial upheaval and quick expansion in recent years. Management information systems (MIS) has a significant part in enabling telecommunication companies to manage their operations effectively, optimize resources, and capitalize on emerging opportunities. Throughout this literature survey researcher seeks to explore the role of MIS in the telecommunication sector of Bangladesh.

Salameh and other reserchers mentioned in their sudies that MIS integrates information technology, personnel, and business procedures to record, store, and process data, yielding datadriven insights for managerial decision-making. It encompasses systems, hardware, processes, and people working in unison to generate useful organizational information. However, not all MIS meet stakeholder requirements due to factors like inadequate design or user training (Salameh A. Mjlae et al., 2020) .

Resercher Purkar suggested that a management information system is an essential for modern organizations, utilizing computer-based processes to deliver timely and effective information crucial for decision-making and other management functions. With the exponential growth of business data, efficient decision-making relies on fast, accurate, and high-quality information managed by competent staff. The rapid advancement of information technology and telecommunications enables organizations to enhance decision-making quality across all levels. Adequate MIS is vital in bridging the gap between managerial needs and expectations by facilitating the flow of information, ensuring effective d ecision-making at every level [2]. Kulbir and Balajeet declared in their research that MIS largely entails processing data into actionable information, which is subsequently shared across many departments for effective decision-making. It encompasses the utilization of people, technology, and information resources. Unlike other information systems, MIS specifically analyzes operational activities within organizations. In academic discourse, MIS typically suggests to a spectrum of information management technologies targeted at automating or aiding human decision-making, such as descision support system or DSS, Expart system, Executive information system or ESS. Different organizational levels, functions, and processes necessitate various types of MIS, presenting both opportunities and challenges [3].

Mishra and other researcher mentioned in their research that is emphasised the organization necessity, advantages, and model of MIS within organizations. In order to understand how decisions are made inside an organization, it gives a general overview of the decision-making structure and process. However, the primary focus lies on exploring the pivotal role of MIS in organizational decision-making. The paper discusses how MIS aids in decision-making, the challenges organizations encounter in this process and offers recommendations to address these challenges [4].

Resecher Mohammed Rafiqul Islam has mentioned in his study that MIS aimed to determine the effects of MIS and the interactions between MIS and organizational decision-making. MIS

comprises hardware, software, databases, networks, and personnel, working together to collect, store, and process data for organizational information. Secondary data was gathered and a descriptive design was used in the study by the researcher. Results from a range of literature sources suggested that MIS furnishes structured, real-time information to management, suggesting a strong correlation between MIS and organizational decision-making. It emphasized MIS's crucial role in providing necessary information, analyzing situations, identifying problems, and supporting management decision-making processes [5].

3. *Objectives of the Study*

- To understand the notion of MIS and Organization.
- To analyze the relationship between the MIS and the organizational performance.

4. *Hypothesis of the Study*

H_0:There is no significant association between MIS and organizational performance.

H_1:There is a significant association between MIS and organizational performance.

5. *Methodology of the Study*

The research methodology includes several approaches, such as collecting data, analyzing it, and accuracy evaluation of search results. A descriptive research design was applied in this study, entailing the collection based on the primary data and the secondary data.

Based on the primary and the secondary data sources had to be gathered for this study's data collection. The sampling procedure included convenient sampling techniques, and the researcher selected a sample size of 100 from among all participants in Bangladesh's telecommunications industry. A questionnaire has been used to collect information from business executives. A set of questionnaires has been prepared to gather data for this research and Employees of private communications businesses were given this standardized questionnaire to complete to collect primary data.

Books, research journals, bank brochures, websites of telecommunications companies, and other sources were the sources of secondary data.

6. The Concepts of Management Information Systems (MIS)

MIS is a system that gives supervisors access to the necessary information to make decisions effectively about an organization's operations. MIS is a computerized system that gives managers the resources they need to effectively manage, assess, and arrange data in order to facilitate internal decision-making. It is made up of individuals, databases, hardware, software, processes, and procedures working together to gather, process, store, and distribute data. Kenneth C. Laudon and Jane P. Laudon mentioned that MIS helps in planning, controlling, and decision-making at various levels of management [6]. MIS consist of three parts like management, information, and systems.
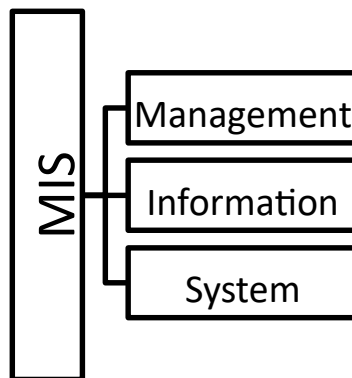

Figure 1. The basic concept of MIS

6.1 Management

Al-Najjar and F.G. found that management is a multifaceted discipline that encompasses a range of activities aimed at achieving organizational objectives through the effective utilization of resources [7]. Let's delve deeper into each component:

- **Planning and Decision Making**: The planning and decision-making process is fundamental to process for the management. This entails deciding on a plan of action, defining goals, and selecting the best tactics to reach those goals. Through careful planning, managers anticipate future challenges and opportunities, enabling them to make informed decisions that align with the organization's mission and goals.

- **Organizing**: Organizing resources in a way that makes goal attainment easier comes next after decisions have been made and goals have been set. This involves setting up the organization's workflows, roles, and duties. Efficient work allocation, excellent resource use, and simplified team member coordination are all ensured by effective organizing.

- **Influencing**: Management also entails influencing individuals and groups to work towards common goals. This involves leadership, motivation, and communication skills to inspire and guide employees towards peak performance. Effective managers possess the ability to inspire trust, foster collaboration, and resolve conflicts, thereby creating a positive work environment conducive to productivity and innovation.

- **Controlling**: The final component of management involves monitoring performance and implementing corrective measures when necessary. Through various control mechanisms such as feedback systems, performance evaluations, and key performance indicators (KPIs), managers assess progress toward goals and identify deviations from the planned course of action. Managers can guarantee that the organization stays on course and effectively adjusts to changing conditions by implementing timely corrective actions.

In reality, management acts as a dynamic, iterative process that calls for a blend of strategic thinking, interpersonal skills, and analytical abilities. In a business environment that is always changing, competent managers use their knowledge of organizing, planning, influencing, and controlling to lead their companies to success.

6.2 Data and Information

Patterson and A mentioned in their study tha data refers to unprocessed facts and figures lacking context or purposeful meaning. It is the basis for creating information and can take many different forms, like numbers, dates, or measures. [8].

Information, on the other hand, is the result of processing and transforming data into a meaningful and useful context. This transformation involves analyzing, interpreting, and organizing data to provide insights or knowledge that can inform decision-making and enhance understanding. Data is presented in a way that makes it easier for readers to understand and take action by customizing the information to match their unique needs. Thus, while data represents the starting point, information represents the refined output that enables users to derive value and make informed choices.

6.3 System

O'Brien, J.A. and other reserchers mentioned that A system is an arrangement of related tasks or parts that cooperate to accomplish a common objective [9]. This idea, as applied to MIS, entails coordinating a variety of tasks and procedures to make it easier to collect, process, and distribute data for managerial decision-making. In essence, MIS integrates technology, people, and processes to optimize organizational performance and efficiency.

6.4 Functions of Management Information System

Nowduri1 and other researchers mentioned that MIS serves as a crucial tool for organizations to efficiently manage their operations and make informed decisions [13]. Here are the key functions of MIS:

- Data Collection: MIS gathers data from various sources within and outside the organization, including transactions, operations, and external market data.
- Data Processing: Once collected, MIS processes the raw data into meaningful information through sorting, filtering, analyzing, and summarizing processes.
- Storage: Processed data is stored in databases or data warehouses for easy access and retrieval when needed.
- Retrieval: MIS allows users to retrieve relevant information quickly and efficiently using various querying methods and interfaces.
- Analysis: MIS provides tools for analyzing data trends, patterns, and relationships to gain insights into the organization's performance and market dynamics.
- Information Presentation: MIS provides decision-makers with easily interpreted reports, charts, graphs, and dashboards that display the processed data.
- Decision Support: By offering projections, predictive analytics, and timely and accurate information, MIS helps managers make well-informed decisions.
- Communication: MIS facilitates communication and collaboration among different departments and levels of management by sharing relevant information across the organization.
- Control: MIS helps in monitoring and controlling organizational processes by setting benchmarks, tracking performance metrics, and identifying deviations from planned targets.

- Strategic Planning: By offering insights into market trends, competitive analysis, and internal capabilities to develop long-term goals and strategies, MIS helps strategic planning operations.

6.5 Benefits of MIS

Al-Mamary and other researchers mentioned in their study MIS offer numerous benefits to organizations. By providing timely and accurate information, MIS empowers decision-makers at all levels to make informed choices swiftly, leading to improved decision-making processes [16]. Additionally, MIS streamlines operations, automates tasks, and enhances workflow efficiency, thereby boosting productivity and reducing costs. Moreover, MIS facilitates strategic planning by offering access to historical data, market trends, and forecasts, enabling organizations to align their strategies with business objectives effectively. Furthermore, MIS enhances communication and collaboration among teams by providing a centralized platform for information sharing and coordination. In the end, MIS helps to improve customer service by providing access to consumer information and preferences, enabling customized service delivery, and encouraging client loyalty and satisfaction.

7. Organizational Performance

Al Matrooshi and other reserchers showed that organizational performance is the extent to which an organization's accomplishments correspond with its set objectives [10]. Sharoo Nawrooz Fadhil, Nozad Mahmood and Nozad Mahmood mentioned in their study that, It basically compares an organization's production to its original strategy. This idea emphasizes how crucial it is to manage people, processes, and resources well in order to achieve desired results [11]. Al.Gharaibeh and other reserchers showed that, Individual productivity plays a major role in a company's performance, which emphasizes the significance of task completion as a crucial element of effective leadership. Accordingly, technology has had a significant influence on streamlining operations and reducing time, costs, and effort in organizational administration [12]. This has fueled the shift to e-government. MIS, which help to centralize managerial activities through data gathering, organization, and sharing, are a result of this technological transition.

8. Management Information Systems in Organizations

Al-Najjar, F.G. mentioned in their study that MIS hold a strategic significance within organizations, providing timely and pertinent information to management for various functions,

including planning, organizing, directing, controlling, and decision-making. In today's business landscape, MIS is indispensable, with every organization requiring it to monitor their activities effectively. The influence of MIS extends to managerial decisions, employee management, product development, and overall business operations, making it an integral aspect of contemporary organizations [15]. As such, the responsibility for MIS cannot be solely delegated to technical personnel, as it directly impacts managerial processes and organizational success. MIS has become deeply ingrained in daily business operations, akin to other major functions like accounting, finance, and marketing. Its importance is underscored by its role in enhancing business efficiency, managerial decision-making, and collaborative work processes, thereby bolstering competitiveness in dynamic market environments. Because MIS is crucial to achieving corporate success in today's global marketplace, it is therefore vital for aspiring managers, entrepreneurs, and business professionals to have a solid understanding of the subject.

9. Telecommunication Sectors in Bangladesh

Al-Mamary and others mentioned in their research work that in Bangladesh, the rapid advancement of information and communication technology which is known as ICT, has similarly presented a plethora of opportunities for both businesses and communities . However, despite the proliferation of current telecommunication devices and networking, there remains a notable gap in ICT adoption between developed and developing countries. In terms of telecommunications infrastructure, Bangladesh boasts a range of providers offering services across the country [16]. One of the main companies in the telecommunications industry is the government-owned "Bangladesh Telecommunication Company Limited (BTCL)". In addition, a number of private telecom firms that provide mobile services to customers including Grameenphone, Robi, Banglalink, and Teletalk. Over the years, these companies have seen a significant increase in the number of subscribers as they have broadened their service to include outlying corners of the nation. Moreover, Bangladesh has seen the introduction of advanced technologies, such as 4G and 5G networks, further enhancing connectivity and communication capabilities. Despite challenges, the telecommunications sector in Bangladesh continues to evolve, with efforts to bridge the digital divide and promote widespread ICT adoption across the country.

10. MIS in Telecommunication Sectors

Al-Mamary and others mentioned in their study that In Bangladesh's telecom industry, MIS are essential for effective operations, decision-making, and customer support [16]. The telecommunications sector in Bangladesh is fiercely competitive, developing quickly, and dominated by a few significant companies fighting for market dominance. MIS enables these companies to manage their resources effectively, optimize network performance, and provide innovative services to consumers. The Bangladesh Telecommunication Regulatory Commission (BTRC) estimates that by the end of 2021, there would be over 181 million mobile phone subscribers in Bangladesh, a considerable increase from the country's previous telecom figures. This broad reach and the strong demand for telecom services emphasize how crucial MIS is to effectively managing the enormous networks. Major players like Grameenphone, Robi, and Banglalink have been expanding their 4G network coverage to provide faster and more reliable internet services to their subscribers, showcasing their investments in technology infrastructure. A MIS's ability to provide customized services and quickly handle client inquiries through efficient customer relationship management (CRM) is essential to improving customer experiences. Furthermore, the BTRC data indicates that the telecom industry makes a substantial contribution to the Bangladeshi economy, accounting for around 6.5% of the GDP in the fiscal year 2020–2021. This illustrates the significance MIS has in improving customer experiences, increasing efficiency, and fostering economic growth in Bangladesh's telecom industry.

11. Ethics is an Information Society

Kenneth C and other reserchers mentioned that ethics penetrate all facets of the telecommunications industry in an information society, radically influencing the ways in which information is sent, received, and used. Large volumes of data are transported by telecommunication technologies, thus privacy, security, and fair access must all be protected. Ethical frameworks oversee decisions about censorship, monitoring, and striking a balance between private profit and public welfare, encompassing topics ranging from data encryption to net neutrality [6]. Furthermore, ethical behavior is crucial to bridging the digital divide and ensuring that marginalized groups have equal access to the digital world. The telecommunications industry faces a vital role in promoting a just and inclusive Information Society, as seen by the increasingly complicated ethical problems surrounding artificial intelligence, data ownership, and algorithmic biases. As technology advances, these questions become increasingly important.

12.Data Analysis and Discussion:

Descriptive Statistic

Here, the researcher has chosen 1 to 5 Likert scale to receive the responder's data where 1 strongly disagrees and 5 strongly agree. By the SPSS researcher calculated mean and standerd deviation based on the responders data.

12.1 The Use of Management Information System (MIS)

Table 1: MIS Uses

	Mean	Std. Deviation
1. I use managerial programs in my work	4.3800	.76251
2. We use internet in managerial works	4.4100	.75338
3. Our company depends on *MIS*	4.6400	.57770
4. Our customers are buying the company products using website	3.9500	.95743
5. *MIS* is secure	4.2800	.86550
6. *MIS* gives better output than the traditional one	4.6500	.60927
7. *MIS* is safer for account information	4.6300	.52522
8. Managerial mistakes are less in *MIS*	4.5800	.62247
9. Company can update *MIS* at any time on database	4.7300	.52905
10. Company can develop *MIS* easily	4.5200	.70324
11. Your *MIS* is completely for managerial operations	4.5100	.71767
12. Upgraded *MIS* do not need to change the current system	4.2700	.76350

(Source: SPSS Generated)

Because the resultant means in the above table are higher than the conventional mean of three, it is evident that respondents had a good attitude regarding using the MIS. Additionally, the researcher found that the standard deviations are less than one, indicating that the data's variability is not excessive.

12.2 Organizational Performance

Table 2: Organizational Performances

	Mean	Std. Deviation
Employer can use management information system easily to increase organizational performance	4.4800	.71746
Employer can control the feathers of management information system easily to increase organizational performance	4.6100	.60126
Mistakes are under control in management information system. As it can increase organization performance by taking feedback	4.6900	.59789
Managerial information system is suitable for our sector	3.3200	.27266

(Source: SPSS Generated)

Given that all of the mean values in Table 2 above are larger than 3, it is clear that respondents had a good opinion regarding their organizational performance. Additionally, because the standard deviations are smaller than one, the data's variability is not excessive.

Hypothesis result

Table 3. Classification Table

Organizational Performance * Management Information System Crosstabulation				
Count				
		Management Information System		Total
		No	Yes	
Organizational Performance	No	8	3	11
	Yes	3	86	89
Total		11	89	100

(Source: SPSS Generated)

Here, for each individual, mean Organizational Performance and mean Management Information System are calculated. Means greater than the standard mean 3 are coded as Yes, and less than 3 are coded as zero.

Table 4. Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)	Exact Sig. (2sided)	Exact Sig. (1sided)
Pearson Chi-Square	48.103[a]	1	.000		
Continuity Correction[b]	41.280	1	.000		
Likelihood Ratio	30.174	1	.000		
Fisher's Exact Test				.000	.000
Linear-by-Linear Association	47.622	1	.000		
N of Valid Cases	100				
a. 1 cells (25.0%) have expected count less than 5. The minimum expected count is 1.21.					
b. Computed only for a 2x2 table					

(Source: SPSS Generated)

The chi-square p-value shows that the null hypothesis is rejected at a 5% level of significance. This indicates an association between MIS and organizational performance.

13. Conclusion and Recommendations

This research work clarified the role of *MIS* in Bangladesh's telecommunication industry and gave a survey of the literature on the subject. This paper explains the advantages of adopting *MIS* in the telecommunications business. These industries operate more efficiently because *MIS* make it simpler to gather, store, process, and retrieve data as needed.

This reserch mostly encourages the telecoms industry to use it. The majority of research participants had favorable opinions about the use of MIS. Additionally, we discovered a link between MIS and organizational performance. To improve organizational performance, researchers encourage the telecom industry to employ MIS carefully.

References

Al Matrooshi, B., Singh, S.K. and Faro uk, S. 2016, "Determinants of organizational performance: a proposed framework", International Journal of Productivity and Performance Management, Vol. 65 No. 6, pp. 844-859.

Al.Gharaibeh, S. M. & Malkawi, N. M., 2013. The Impact of Management Information Systems on the Performance of Governmental Organizations- Study at Jordanian Ministry of Planning. International Journal of Business and Social Science, 4, No. 13 (Special Issue), pp. 101-109.

Al-Mamary, Y.H., & Shamsuddin, A., & Nor Aziati, A.H. (2014) Key factors enhancing acceptance of management information systems in Yemeni companies, Journal of Business and Management Research, Volume. 5, pp. 108-111.

Al-Najjar, F.G. (2010) Management Information Systems Managerial Perspective, daralhamed for Publishing and Distribution.

Al-Najjar, F.G. (2010) Management Information Systems Managerial Perspective, daralhamed for Publishing and Distribution.

Kenneth C. Laudon and Jane P. Laudon (2020) Management Information Systems: Managing the digital firm, 16th Global edition,

Kulbir Singh and Baljeet Kaur (2012) Role of Management Information System in Business: Opportunities and Challenges, GIAN JYOTI E-JOURNAL, Volume 1, Issue 2.

Lahar Mishra, Ratna Kendhe, and Janhavi Bhalerao (2015) Review on Management Information Systems (MIS) and its Role in Decision Making, International Journal of Scientific and Research Publications, Volume 5, Issue 10, 1-5.

Mohammed Rafiqul Islam (2018) Impacts of Management Information System on Decision Making of the Organization, International Journal Of Business, Social And Scientific Research issn, Vol. 6, Issue: 2, Page: 56-61.

Nowduri1, S., & Al-Dossary, S. (2012). Management Information Systems and Its Support to Sustainable Small and Medium Enterprises, International Journal of Business and Management; Vol. 7, No. 19, pp. 125-131.

O'Brien, J.A.,& Marakas, G.M. (2007) Management information systems-10th ed., by McGrawHill/Irwin, a business unit of The McGraw-Hill Companies.

Patterson, A. (2005) Information Systems-Using Information, Learning and Teaching Scotland. Salameh A. Mjlae et al (2020) The Effectiveness Of Management Information System In Decision-Making, Journal of Mechanics of Continua and Methametical Sciences, Vol. 15, No. 07, 316-327.

Sharoo Nawrooz Fadhil, Nozad Mahmood and Nozad Mahmood (2021) "The Significance of Management Information System in Improving Organizational Performance and Effectiveness" Journal of Garmian University, Vol. 7, Issue 4, Page:195-211

Shreyas Purkar et al (2020) The Role of Management Information Systems in Organizations, Gradiva Review Journal, Vol. 09, Issue 09, 506-316.

Yaser Hasan Al-Mamary*, Alina Shamsuddin, Nor Aziati (2014) The Meaning of Management Information Systems and its Role in Telecommunication Companies in Yemen, American journal of software engineering, Vol, 2 , No 2, 22-25.