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A Study on Production Planning and Control Use A Various Functions of Quality for Improving Cost of Productions in Pune District.

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Abstract: Production Control can be looked up based upon the requirements and customer's needs. In return, it implicates need of verification with respect to quality on the parameters of improvement quality of services and articles. Speaking about the possible utilization of repairing methods in organization, mentioning the precise qualifications of criterion utilization of tools used in improvement in quality is necessary. Defects during casting however be revealed either during the machining, assembly or component utilization phase. The customer may pass the resultant value added costs or warranty costs onto the foundry. This research work consists of analysis of types of castings and there sub-products. In the most sized plants make the situation considerably make them create such administration pretentious and cost effective integrated management systems. Production quality, safety, protection of health, and environmental protection in work atmospheres are an integral part in 'modern management systems'.

Keywords: *Production Control, Quality of Production, Improvement in PPC, foundry defects*

Introduction :

Production Control has been a long-standing subject, especially the matter of during period 1970 BC was introduced. Until advent mass production. Monopolistic unions were structured for ensuring through as well as, was set in large factories which employed militaries of persons which was in turn giving rise to new ways of management. Scientific management as given by Frederick Taylor fetched efficient operations for increasing output by segregating jobs into various parts leading to mass production where each worker was assigned a single task.

Mass producing practices gained striking early dividends. Henry Ford (1863-1947) constructed over how mass production brought increased productivity. Ford then flow lines and workers did thoughtlessly monotonous tasks. In its part of cost control, for producing lower prices, Ford fixed the price and confronted the organization for ensuring that the costs were sufficiently low in order to come across the figure. Scientific management emphasized disconnect of concept from its execution as well as labor substitutability. The concept of craftsmen vanished with Taylors. Inspection therefore endured the lone quality guarantor. Product was no longer built with Quality. The 'success in the war', thus led to establishment of institutes and associations as well as the publication of formalized quality of ideas. In 1919, which became Britain. In 1931, was published by Stern methods for observing and assessing everyday producing and improvement in quality were recorded. Konosuke Matsushita, Japanese businessman and group's founder influenced greatly by Henry Ford's. Suppliers, however, are also essential- Matsushita visited his supplier factories in 1930s and gave them advices based on effective production.

The industry was again bashed off-balance by the Second World War. More profound and longer lasting effects were found in North America. The War Production Board trained thousands of quality specialists and created. The memberships in were expanded approximately upto 50000. One of the defeated nations, however, was the one to come up successfully with the quality thinking. A new nationalistic drive was launched by the Japanese in order to expand and pursue their economic goals rather than military goals. W. Edwards Deming, was famous expert who served a key purpose in this upgradation process in collaboration with people like J. M. Juran from the United States. During the war as well as in the post-war period, Americans had an advantage of close participation over functioning with respect to sound quality systems. The Western method, the American Approach to Quality, the invention plan preferred by the U.S. after the war period considered to be policy in a period of economic resources low international competition and, expanding markets. During that period, it is given highest importance to quantity than quality and management is interested in reducing cost and increasing production. It was made clear by Juran in the Harvard Business Review article (1993) during the 1950s, his Japanese audiences were the main managers of chief establishments while the North American viewers were mainly quality inspectors and engineers. In the Eastern approach, especially Japanese approach to Quality, managers took the advices about upcoming modifications in the customer's insight regarding quality as well as their future demands very seriously so that they could quickly develop their customer-oriented services and products. In short, these concepts were easy to

work out with given by when it comes to fine craftsmanship. The strong statistical essence of early work with an emphasis over quantitative variant within quality suited very well for numbers with the Japanese penchants. Since, Japan was poor in terms of natural resources, the only option for it was to export good quality goods at lower rates in order to afford the food and other essentials that were needed.

Review of Literature :

Feignbaum A.V. (1991), mentioned that Production Quality, safety, health and environment protection in work environments are integral parts in refers to a incorporating to a single continuous system allowing them in reaching the desired missions as well as goals.

According to PRIBULOVÁ A. (2010), the concept of Integrated Management System arrived as a Foundry is continuous process of steel iron occurrence of steel iron. Process of Foundry production consists of mold preparation as well as production of non-ferrous as well as ferrous metal castings takes place in the foundries. Ferrous castings include steel and iron, whereas non-ferrous castings mainly consist of copper, aluminum, zinc, tin, lead, magnesium, titanium and nickel formed of non ferrous as well as non-ferrous materials.

There are various number of casting techniques which involve construction of mold where a metal is melted and poured inside it. It is further divided into, very with respect even though as well, use. On the other hand, which is implemented, involves usage of once used, cannot be reused and are hence whereas, various methods in upon the applied. The following processes take place in a typical foundry: melting and treatment of metal in the melting shop; mold and core preparation in, cool down solidifying removal of shop where finishing occurs. Electric arc furnaces or coreless induction furnaces are used in the melting process if Cast metal. The treatment of Cast steel consists of refining as well as deoxidization based on the metal charge as well as the quality requirement of the casting product (PRIBULOVÁ A. 2009).

Integrated Management System in foundry thus arrives the idea upon the suitability according to standards. Caused presently, isn't taken into consideration, nonetheless probability "combination" has been ISO 14000 and ISO 9000 systems have their compatibility there a for harmonizing integrating. However regular is not containing total requests precise supplementary business know how to adapt its Quality Management System (ISO 9001:2000) regardless about the fact that ISO 9001 doesn't consist of all requirements particularly for other systems of management.

The three above mentioned management systems have numerous similarities between them which are as follows:

a. Commitment of organization's management.
b. Control of documentation and records.
c. Politics and goals of the management.
d. Orientation to customer.
e. Responsibility, authority, communication.
f. Management review.
g. Representative of Management.
h. Source provision (human, financial, material, information).
i. Analysis of casting defects
j. Competence, education and training.
k. Internal audits.
l. Metrology.
m. Monitoring and measurement.

Quality can be perceived on the basis of costumers' needs and requirements. It, in return, involves need of verification according to this, i.e. quality inspection. Separations in for investigation of phase's information sequence regarding as well as the quality features that occur in assured methods. Effect gathered norms in manufacture might be utilized or intended for active request of various types in analytical tools. According to OTT D. (1997), molding flaws may have a negative effect over the bottom-line of a foundry.

Identification of problem formations' sources has been made possible by Ishikawa's diagram (also known as the "fish bone diagram") which is generally a diagram for cause and effect. According to Siekanski K. (2002), it also helps in identifying a sequence of problems causing challenges in the next phases: research, therapy and diagnosis select while making easy solutions for problems.

According to Fayol, "Control consists in verifying whether everything occurs in conformity with the adopted plan and established principles. The objective of control is to point out weaknesses and shortcomings, if any, in order to rectify them and prevent recurrence. It operates on everything viz. Material, equipment, men, operations etc. For control to be effective, it must be applied within reasonable time and be followed-up sanctions." ..BY Hennery Fayol

"Production is Management concerns itself with the conversion of inputs into outputs using physical resources." ….By- S.N. Chary,, Tata McGraw-Hill. Third Edition, Production and Operations Management .pp 02, Fourteenth reprint 2008

"Just-in-Time (JIT) is a system to produce and deliver finished goods just in time to be sold, sub-assemblies just-in-time to be assembled into finished goods, and purchase materials just in time to be transformed into fabricated parts."

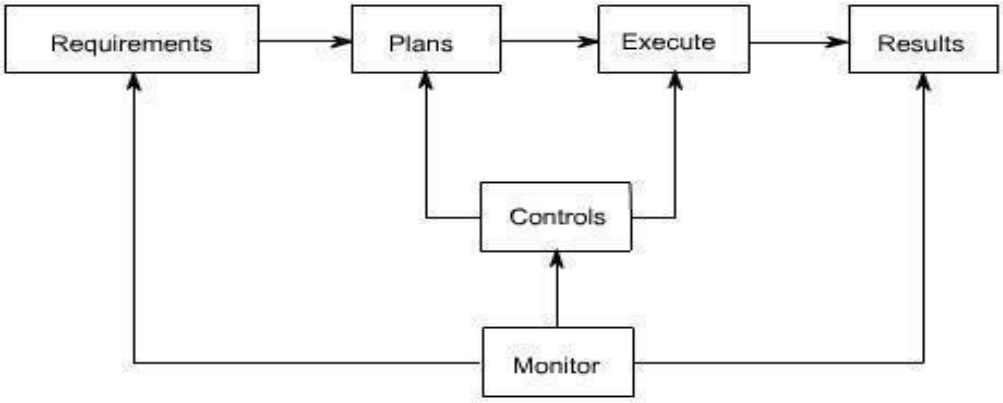

Figure: Architecture of System

The most common castings defects

Casting process may come up with various defects which in turn reduces the total output of it alongside increases their production cost. Thus, it is important to consider and understand their causes, the imperfection or output that is obtained which is very contradictory to the quality requirements.

There are basically three types of Casting Defects:

1. Major defects, that can't be rectified, which results in denial of the molding ultimately leading to entire damage;
2. Rectifiable Flaws which may be treated, however the repair cost may not be a justification for the attempt of salvage;
3. Minor defects, those undoubtedly allow economic salvation of the castings thereby leaving a reasonable profit margin.

Reasons for such defects:

• Unsatisfactory or Unsuitable raw resources utilized in main creating, molding or casting; Applying inacceptable casting or molding exercise thru single employee(s) or incorrect instructions by the supervisor;

- Usage of inappropriate equipment, tools, patterns or appliances; and
- Improper management policy techniques, out of order organization and lack of training or poor work discipline.

According to Garvin, "Quality is an oddly dicey concept which is easy for visualizing, yet irritatingly challenging when defining."

The quality usually expresses notions of vague factors which aren't readily tied down or measured. Quality expresses a positive implication whatsoever it is directed to. In its own right, it can be acompelling value and is robust enough in pertaining towards products, service standards, innovations, and people's caliber …. Everyone at every level can do something about it and feel satisfied about making a difference. Providing quality service and making quality products that work can be identified with from ones' own experience. (Pascale, 1991)

Quality can be evidently defined through several approaches such as:

- Peters, (1989), mentioned about Quality means delighting the customer ,
- Feigenbaum, (1983) mentioned that it is well-defined as being about value.
- Crosby, (1979) says conformance to specifications, standards or requirements.
- Peters and Waterman, (1982) mentioned about Quality as excellence.
- Juran, 1989, explains its fitness for use.
- Parasuraman et al., (1985), says that Quality deals with meeting or exceeding customers' expectations

Each approach when defined with quality has strong points with respect to generalizability, comfort of utility as well as measurement. Hence, the superiority as conformance to criteria method is further significant in an environment for engineering in influenced individual service industry alongside being of countless value to emphasize productivity and efficiency. Quality as superiority is perceived to be equally valuable to a motivational expedient in a 'general call to arms' when it comes to quality management movement. Workforces may yield superiority in functioning for an association whose mission and vision reports highlight over existence the greatest.

Besides all of the above, every approach has its own disadvantages. Hence, a quality vision for conforming to standards each and every time is very unlikely being as effective when compared with proves to be 'Quality as excellence' when appealing employee assurance towards

Objectives of Research :

1. To study the awareness and usage of Production Control in various functions of large-scale industries in Pune District.
2. Impact Production Control selected in Pune District
3. To understand the impact on cost of production.
4. To work on the Production Control to reduce the wastage of raw material.
5. To understand the different factors responsible for wastage.

Hypothesis :

Based on the objectives following hypothesis can be worked on

- H1: - There is significant difference across production control function helps to formulate Policies to better performance of large-scale industries.
- H0: - There is no significant difference across Production control function does not helps to formulate policies to better performance of large scale industries
- H2: - There is significant difference across production control function helps to formulate Policies to better performance of large-scale industries.
- H0: - There is no significant across production control function helps to formulate policies to better performance of large-scale industries.
- H3: - There is significant difference across awareness and usage of Production Control in various functions of large-scale industries in Pune District.
- H0: - There is no significant difference across awareness and usage of Production Control in various functions of large-scale industries in Pune District.

Data and Methodology :

a. Population and sample size: There are around 70 firms in and around Pune District. Randomly a few firms around 30 manufacturing units has been taken in to accounts.A Structured Questionnaire is designed comprising of 25questions selected to understand Quality and Works managers was taken from Primary data collection.

b. These determinant were put on to a scale of five-point Liker Scale, where 1 being never used to 5 being extensively practiced.

c.Reliability of data: A 29-items questionnaire was framed and circulated among the Quality Assurance and Production Managers/Works Managers.

d. In order to understand the questionnaires reliability, Cronbach's alpha test was run on 10 manufacturing units, which is considered as Pilot study.

e. Hypothesis testing can be carried out understand the reliability, applicability by performing Chi2, T-Test, Z-test and other tests were carried out.

Conclusion :

The paper presented, identifies the importance of Production Control for cutting short of wastages and damages in the manufacturing process and implementation of the same is difficult task to be carried out. The main finding of the research paper is Firstly, most of the production control in large scale Industries or manufacturing units are having ISO 9000:2000 standards.

Secondly, the manufacturing units differs in implementation of Production Control in the production processes. Thirdly, some of the units are following Production Control , TQM and Kaizen models but others are not.

Limitation and scope for further research:

The study was performed on selected production or manufacturing units of Pune District. Further studies can be focus on same type of production or manufacturing firm but for other areas. The period of study was executed during the month of April-May 2020-21.Firms that use the tools process management like failure mode, and effect analysis and quality functions deployments can further be studied like tools like Kaizen, TQM and the hurdles to implementation of the same methodology can be studied further. Due to COVID-19 pandemic scenario most of the firms suffers Lock-down, this could be another constraints before the researchers.

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Exploring the Investment Landscape in Ahilyanagar District: Perspectives on New Financial Instruments

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Abstract: This study examines investors' perceptions regarding investments in emerging financial opportunities. Investment refers to the allocation of funds in financial or non-financial assets with the expectation of generating returns over time. A potential investor is someone who has surplus funds beyond their immediate consumption needs. A solid understanding of diverse investment avenues allows individuals to make informed choices. The selection of investments is guided by the desired returns and the investor's risk tolerance. The investment process typically begins with identifying clear objectives, followed by formulating an investment strategy, which is shaped by the investor's mindset. However, perceptions can vary based on factors such as age, gender, occupation, education, and income. This research focuses on the perceptions of investors towards new financial avenues in Ahilyanagar city, Maharashtra. The study utilizes both primary and secondary data, with a sample size of 200 respondents. The findings suggest that investors who prefer cryptocurrency are more inclined to explore higher –risk investment options.

Keywords*: Investment, Emerging Financial Products, Fintech, Investment Objectives.*

Introduction:

The economic prosperity of a nation is intricately tied to the strength and organization of its financial system. A well-functioning financial system is a cornerstone of economic growth, encompassing two primary elements: financial markets and financial institutions, both of which work in tandem to provide stability and drive growth. This system's main function is to facilitate the efficient mobilization of savings, converting them into investments in productive ventures that promote long-term economic development. It serves as a conduit for directing funds from savers to borrowers, ensuring that capital is allocated effectively.

Additionally, a robust financial system supports liquidity, reduces risks, and provides the infrastructure needed for businesses and individuals to manage their financial resources effectively. By encouraging both investment and savings, it plays a pivotal role in the acceleration of economic growth, job creation, and the overall development of a country.

Investment:

Investment refers to the act of foregoing certain resources in the present, with the anticipation of gaining benefits in the future. The core elements of investment are the present sacrifice and the future reward. In essence, it involves giving up some current value in exchange for the uncertain prospect of future returns. Investment can be understood as the process of allocating funds—whether in financial or physical assets—with the expectation that these resources will generate additional returns over time. However, this expectation carries a degree of uncertainty, as the returns may fluctuate, ranging from the minimum to the maximum. The potential for these variations in returns is referred to as investment risk. Therefore, every investment inherently comes with both the potential for returns and the associated risks.

Investor's Perception:

Investor perception refers to the decision-making process involved in selecting, acquiring, and utilizing financial products or services to fulfill their investment objectives. The process involves several stages, beginning with the investor's identification of the type of investments that align with their goals and preferences. Once the options are narrowed down, the investor chooses those that offer the greatest potential for returns or utility. Following this, the investor evaluates their available financial resources to determine the amount of capital they can allocate to the chosen investment. Finally, the investor reviews the current market conditions, including the prevailing prices and potential for growth, before making the final decision on which investment to pursue. This entire process is shaped by the investor's goals, risk tolerance, and market understanding.

Emerging Financial Products:

Cryptocurrency: Cryptocurrency is a form of digital or virtual currency that uses cryptography for security. These assets, such as Bitcoin, Ethereum, and others, are decentralized and operate on blockchain technology. Cryptocurrencies offer a high-risk, high-reward investment opportunity, where investors can benefit from price fluctuations, but they also face significant volatility and regulatory uncertainty.

Leasing: Leasing involves an investor providing a fixed asset, like equipment or real estate, to a lessee for a periodic payment. It is considered a stable investment avenue that generates regular income while the investor retains ownership of the asset. Leasing options can range from commercial properties to machinery or vehicles, and investors can benefit from both rental income and asset appreciation.

Peer-to-Peer Lending: Peer-to-peer (P2P) lending platforms allow investors to lend money directly to borrowers, bypassing traditional financial institutions like banks. In return, investors receive interest payments. This form of lending offers the potential for attractive returns, but it also carries the risk of borrower defaults. P2P lending platforms typically offer a variety of loan types, including personal, business, and student loans.

Loan Syndication: Loan syndication involves multiple lenders pooling their resources to provide a large loan to a borrower, typically a corporation or government entity. This investment avenue allows individual investors to participate in loans that would otherwise be too large for a single lender. Syndicated loans often come with attractive returns and a lower risk profile, as the loan is typically secured and distributed among several lenders.

Custodial Services: Custodial services involve the safekeeping and management of an investor's assets by a third-party financial institution or service provider. These services offer secure storage of securities, cash, or other assets, ensuring that the investments are protected. Custodians are responsible for administrative functions such as account management, record keeping, and transaction settlements, and they often provide additional services like tax reporting and investment advice.

Objectives of the Study:

1. To examine the attitudes and perceptions of investors regarding different investment avenues.
2. To assess the level of knowledge and preferences that investors have when selecting various investment options.

Review of Literature:

Narayanan et al. (2016) and **Catalini & Gans (2016)** suggest that cryptocurrencies, such as Bitcoin and Ethereum, have the potential to revolutionize financial systems by offering decentralized, peer-to-peer transactions that do not require intermediaries like banks. Cryptocurrencies have grown in popularity due to their ability to offer high returns, but they come with significant risks, including volatility and regulatory uncertainty

Chen et al. (2016) found that syndicated loans are beneficial for both borrowers and lenders. For borrowers, they provide access to larger amounts of capital at favorable terms, while

lenders benefit from reduced exposure to risk.

Levine (2016) emphasized that custodians play a crucial role in the financial ecosystem by protecting investors from fraud and ensuring regulatory compliance. As the investment landscape evolves with new asset classes like cryptocurrencies, custodians have adapted to offer digital asset custody services, as seen in the study by **Alvarez (2019).**

Freedman & Jin (2017) argue that P2P lending platforms provide easier access to credit for borrowers, particularly for those who may not qualify for loans from traditional financial institutions. The platforms typically offer competitive interest rates, benefiting both lenders and borrowers by eliminating the need for intermediaries.

Richter (2015) explains that leasing is an attractive alternative to direct ownership for many businesses, as it allows them to preserve capital while still gaining access to necessary equipment or real estate. From an investor's perspective, leasing provides a steady stream of income, which can be particularly attractive for those seeking predictable returns.

Research Methodology:

This study utilizes both primary and secondary data sources to gather comprehensive insights. Primary data is collected using a well-structured questionnaire, designed specifically to align with the research objectives. The questionnaire serves as a tool to capture the perceptions and responses of investors regarding the subject matter of the study. Secondary data is incorporated where necessary, sourced from a variety of relevant reports, books, academic journals, periodicals, newspapers, magazines, and online platforms. The researcher focused on a sample of market investors in Ahilyanagar. To ensure a representative sample, the **simple random sampling** method was employed. The total sample size for the study is 200 respondents.

Data Analysis and Interpretation:

Table 1: Demographic variables of the respondents:

Demographic variables.		**Frequency**	**Percent**	**Cumulative %**
Age	Below 20 years	10	5	5
	20 - 30 years	90	45	50
	30 - 40 years	70	35	85
	Above 40 years	30	15	100
	Total	**200**	**100**	**100**
Gender	Male	130	65	65
	Female	70	35	100
	Total	**200**	**100**	**100**

Occupation	Govt. Employee	30	15	15
	Self Employed	60	30	45
	Private Employee	100	50	95
	Others	10	5	100
	Total	**200**	**100**	**100**
Qualification	Degree	60	30	30
	Post-Graduation	80	40	70
	Professional	50	25	95
	Others	10	5	100
	Total	**200**	**100**	**100**
Income	Below 2Lakhs	20	10	10
	2L - 5 L	70	35	45
	5 L - 10 L	90	45	90
	Above 10 lakhs	20	10	100
	Total	**200**	**100**	**100**

The table above presents a detailed breakdown of the respondents' demographics. It reveals that 45% of respondents fall within the age group of 20-30 years, 35% are aged between 30-40 years, 15% are over 40 years, and 5% are under 20 years. In terms of gender distribution, 65% of the respondents are male, while 35% are female. Regarding employment status, 50% of respondents work in the private sector, 30% are self-employed, 15% are employed by the government, and 5% fall into other categories. Educational qualifications show that 40% of the respondents hold post-graduate degrees, 30% have completed a degree, 25% have a professional qualification, and 5% belong to other educational backgrounds. In terms of income, 45% of respondents earn between 5L-10L annually, 35% fall within the 2L-5L range, 10% earn above 10L, and 15% have an income below 2L.

Table 2: investments preferred by the respondents:

Sr. no.	**Years**	**No. of Respondents**	**Percentage (%)**
1	Below 2 Yrs.	6	6
2	Between 2 – 5 Yrs.	30	30
3	Between 6 – 10 Yrs.	48	48
4	Above 10 Yrs.	16	16
Total		**100**	**100**

The table above highlights the distribution of investment durations among respondents. A significant 48% of participants are committing their funds for a span of 6 to 10 years, while 30% opt for a shorter investment horizon of 2 to 5 years. In contrast, 16% are looking at investments extending beyond 10 years, and 6% prefer to invest for less than 2 years.

Table 3: Percentage of income invested in investments:

Sr. no.	Options	No. of Respondents	Percentage (%)
1	Below 10%	42	21
2	Between 10% -20%	80	40
3	Between 20% - 30%	62	31
4	Above 30%	16	08
Total		**200**	**100**

The table above reveals that 40% of investors are allocating 10% to 20% of their income towards investments. Meanwhile, 31% are investing between 20% and 30% of their earnings. A smaller proportion, 21%, are dedicating less than 10% of their income, while 8% are investing over 30% of their earnings.

Table 4: Investors knowledge regarding investments:

Sr. no.	Options	No. of Respondents	Percentage (%)
1	Basic understanding	38	19
2	Fundamental awareness	51	25.5
3	Fair knowledge	65	32.5
4	Considerable	25	12.5
5	In-depth expertise	21	10.5
Total		**200**	**100**

The above table reveals that 32.5% of the investors have Fair knowledge about the investments, 25.5% has fundamental awareness, 19% of investors have very Basic Understanding, 12.5% has considerable knowledge and 10.5% has In-Depth expertise.

Table 5: Primary objectives of the investments of the respondents:

Sr. no.	Objectives	No. of Respondents	Percentage (%)
1	Retirement savings	22	11
2	Increased earnings/profit	64	32
3	Steady income	94	47
4	Tax relief	14	07
5	Growth in capital value	06	03
Total		**200**	**100**

The table indicates that steady income is the most sought-after goal, with 47% of cryptocurrency investors prioritizing it. A significant portion of respondents identified steady income as their primary investment objective, with the expectation of a consistent return driving this preference. Other objectives, such as increased earnings/profit, Retirement savings, Growth in capital value, and Tax relief, are also highly valued by investors, reflecting a well-rounded approach to their investment strategies.

Table 6: Investors preference of various Investment Avenues:

Sr. no.	Options	No. of Respondents	Percentage (%)	Mean
1	Cryptocurrency	66	33	4.47
2	Loan Syndication	28	14	3.19
3	Custodial Services	24	12	3.14
4	Leasing	48	24	3.92
5	Peer to Peer Lending	34	17	3.64
Total		**200**	**100**	**3.67**

It is evident that respondents show a clear preference for cryptocurrency. This preference highlights their risk-averse nature, as they lean more towards digital assets compared to traditional investment options such as Custodial Services, Factoring, or Loan Syndication. From this, it can be inferred that the investors display a personality type consistent with an **external locus of control,** where they place significant importance on external factors in shaping their lives. This behavior may also point to a **contingency orientation,** where investors seek easy access to liquid cash for unforeseen situations, making them less inclined to invest in instruments that are not easily accessible or liquid.

Finding and Conclusion :

The study revealed that the majority of respondents are aware of emerging financial avenues such as Cryptocurrency, Loan Syndication, Custodial Services, Leasing, and Peer-to-Peer Lending. Among these options, a significant number of participants expressed interest in Cryptocurrency, followed by Leasing, Peer-to-Peer Lending, Loan Syndication, and Custodial Services, respectively. When it comes to investment preferences, the respondents overwhelmingly favored Crypto currency, while

Custodial Services emerged as the least preferred option, with only 12% opting for it. This trend was further corroborated by the mean scores, where Cryptocurrency received the highest score of 4.47, while Custodial Services scored the lowest at 3.14.

The study also highlighted that the primary investment goal for most respondents was steady income, followed by retirement savings, increased earnings/profit, tax relief, and capital appreciation. The analysis clearly demonstrates that investors have diverse perspectives on various factors, including market movements, influencing decision-making, investment frequency, available alternatives, and individual preferences. These factors significantly shape their views on different investment opportunities in the financial market.

In conclusion, the study underscores a growing interest within the Indian investment community in newer financial products, such as cryptocurrencies, amidst the expanding

Indian GDP, improved corporate performance, and more investor-friendly regulations by authorities like SEBI. This trend is expected to accelerate further in the future as the market continues to evolve.

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Predictive Analysis in Marketing Using AI Tools- A Literature Review

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Abstract : With AI-driven insights, predictive analytics in marketing has revolutionized conventional marketing strategies. The use of AI tools in predictive analytics is examined in this review of the literature, which also looks at how companies use statistical methods, data mining, and machine learning to improve decision-making, optimize marketing campaigns, and predict consumer behavior. In order to highlight important approaches, uses, and difficulties in predictive marketing, the paper synthesizes previous research. It explores a number of AI-powered methods that facilitate better customer segmentation, demand forecasting, and personalized marketing efforts, including sentiment analysis, natural language processing (NLP), and predictive modeling. The study also addresses the implementation difficulties, data protection issues, and ethical issues that companies encounter when incorporating AI-driven predictive analytics.

This research offers a thorough grasp of the influence of AI on marketing tactics and its potential ramifications by examining recent developments and case examples. According to the research, firms must manage data security and algorithmic bias concerns to optimize the advantages of AI tools, even when they greatly improve predictive capacities. This study adds to the expanding corpus of research on AI-driven marketing and offers insightful information to researchers, companies, and marketers that want to use predictive analytics to gain a competitive edge.

Key words: *Predictive Analytics, Artificial Intelligence in Marketing, Machine Learning in Marketing, Customer Segmentation, Data-Driven Marketing, AI-Powered Marketing Tools, Marketing Automation*

Introduction:

An Overview of Predictive Analytics in Marketing:

Artificial intelligence (AI)-powered data-driven decision-making has been greatly improved by the use of predictive analytics in marketing. This study reviews the literature on AI-based predictive analytics in marketing, looking at its development, methods, and uses. The study investigates the application of AI to campaign optimization, demand forecasting, and client segmentation. It also assesses popular AI tools and how well they work for predictive

marketing. The article emphasizes how automation, big data, and machine learning are becoming more and more important in contemporary marketing tactics. It also covers issues including algorithmic biases, integration barriers, and data privacy. The ongoing change of marketing strategies through AI developments is highlighted, along with future research areas and new trends in AI-driven predictive analytics.

Analyzing past data and predicting future trends through statistical methods, artificial intelligence algorithms and data mining is known as predictive analytics. By predicting consumer behavior, market dynamics, and campaign results, predictive analytics helps marketers make informed decisions. Budgeting, and targeting, and retention of consumers tactics are all made more effective by this tactic. Predictive analytics, according to studies, helps businesses to proactively address the needs and preferences of their clients, boosting marketing ROI (Chen et al., 2020).

Artificial intelligence (AI) is used in predictive analytics to automate data processing, spot trends, and produce insightful information. Predictive model accuracy is greatly increased by artificial intelligence-powered technologies such algorithmic deep learning, machine learning models, and NLP (natural language processing) algorithms. Analysis of sentiment, fraud detection, personalized recommendations, and consumer segmentation are some of the marketing applications of artificial intelligence.

AI is integrated into tools like Salesforce Einstein, IBM Watson Marketing, and Google Analytics 360 to deliver real-time information that assist marketers improve engagement and optimize their strategy (Smith & Johnson, 2021).

Objectives of the secondary research:

The purpose of this study of the literature is to investigate the different AI-powered predictive analytics tools and how they are used in marketing. The following are among the study's goals:

1. To understand how AI has contributed to the development of predictive analytics in marketing.
2. To evaluate the efficacy of various AI systems for predictive marketing.
3. To recognize the main uses of predictive analytics in marketing decision-making.
4. To identify the advantages, difficulties, and moral dilemmas of AI-powered predictive analytics.
5. To understand new developments and areas for future study in AI-powered predictive marketing.

Literature Review:

Historical Development of Predictive Analysis :

Predictive analytics in marketing is based on conventional statistical techniques such as decision trees, regression modeling, and time series forecasting. In the early 20th century, companies used basic data collection methods to forecast demand and evaluate consumer patterns. Marketers used survey data, sales records, and demographic studies to predict consumer behavior and optimize product placements.

Evolution of Predictive Analysis with the Advent of AI Technologies :

A significant shift was observed in predictive analysis by lates 20th century due to an upswing in digital technology and big data analytics. The beginning of Artificial intelligence, machine learning and data processing program reformed the way of designing marketing strategies. The new change brought by AI helped companies to analyse huge amount of consumer data quickly, increasing accuracy and develop effective predictive models. Targeted marketing has changed because to AI-powered optimization engines like those employed by Netflix and Amazon.

Key Milestones and Breakthroughs in the Field :

The development of predictive analytics in marketing has been influenced by several innovations:

- Expert systems for consumer analysis and corporate intelligence were introduced in the 1980s.
- The 1990s saw the introduction of predictive modeling into customer relationship management (CRM) software.
- 2000s: Big data analytics and machine learning techniques become widely used.
- 2010s: Predictive analytics technologies powered by AI are included into marketing automation systems.
- 2020s: Real-time predictive marketing tactics are being revolutionized by developments in deep learning, neural networks, and generative AI.

Several studies have explored the role of AI-driven predictive analytics in marketing. This section reviews key research articles that have contributed to this field:

1. A study on AI-driven consumer segmentation strategies in predictive marketing was carried out by Chong et al. (2021). According to the study, machine learning techniques like decision trees and K-means clustering greatly improve the accuracy of

customer targeting. The study highlighted how AI may be used to uncover hidden trends in customer behavior.

2. The application of deep learning models to marketing analytics was studied by Huang & Rust (2020). According to the study, neural networks increase the prediction accuracy of tailored marketing campaigns and demand forecasting. The scalability of AI-driven models for big datasets was another topic covered by the writers.
3. The ethical ramifications of artificial intelligence in predictive marketing were examined by Kaplan & Haenlein (2019). Data privacy, algorithmic bias, and openness in AI-driven decision-making were among the topics covered in their study. In order to guarantee the ethical use of AI in marketing, the study suggested legislative frameworks.
4. The use of AI in improving digital marketing efforts was examined by Grewal et al. (2018). The study showed how conversion rates, customer engagement, and content personalization are all improved by predictive analytics. The authors came to the conclusion that data driven by AI give digital marketing tactics a competitive edge.

AI Tools and Technologies in Predictive Analysis:

A correct and efficient predictive analytics depends on advanced technologies like artificial intelligence, machine learning, algorithms, natural language processing (NLP). These technologies analyze big datasets, uncover hidden trends, and produce useful marketing insights. Marketers can improve product suggestions, increase customer retention, and optimize advertising campaigns with AI-driven predictive analytics.

Description of Specific AI Tools and Platforms :

Several popular tools for predictive analytics driven by AI include:

- **IBM Watson**: Uses machine learning and natural language processing to predict market trends and assess customer sentiment.
- **Google Cloud AI**: Offers machine learning models for demand forecasting and consumer segmentation
- **Microsoft Azure AI**: Offers marketing predictive analytics through automated machine learning (Auto ML).
- **Deep learning models** are supported by Amazon Sage Maker for targeted marketing and customer behavior prediction.
- **Salesforce Einstein**: Predicts customer interaction and improves sales tactics by integrating AI into CRM platforms.

Comparison of AI Tools for Predictive Analysis in Marketing :

AI Tool	Key Features	Strengths	Limitations
IBM Watson	NLP, machine learning, sentiment analysis	Advanced cognitive computing, integration with IBM cloud services	High cost, complex setup
Google Cloud AI	ML models, Auto ML, Big Query AI integration	Scalable, user-friendly, robust data processing	Requires Google Cloud ecosystem
Microsoft Azure AI	Automated ML, deep learning, chatbot AI	Strong enterprise support, versatile AI models	Expensive for small businesses
Amazon Sage Maker	Deep learning, Auto ML, real-time prediction	Optimized for e-commerce and personalization	Steeper learning curve
Salesforce Einstein	CRM integration, predictive lead scoring	Seamless integration with Salesforce CRM	Limited customization compared to standalone AI tools

Applications of Predictive Analytics in Marketing :

1. **Consumer Segmentation**: Using demographics, internet activity, and purchase patterns, AI-driven clustering algorithms divide up the consumer base.
2. **Personalized Marketing**: Product suggestions, email marketing campaigns, and content recommendations are all customized using predictive analytics.
3. **Churn Prediction**: AI algorithms detect clients who are likely to leave, enabling companies to put retention plans into place.
4. **Demand Forecasting**: Brands can anticipate changes in demand and improve inventory control with the aid of predictive analytics.
5. **Optimized Advertising Spend**: Predictive algorithms powered by AI identify the best advertising channels and spend amounts.

Challenges and Ethical Considerations :

- ✓ AI-driven predictive analysis in marketing has a number of drawbacks despite its advantages.
- ✓ **Data security and privacy**: When managing consumer data, adherence to laws like the CCPA and GDPR is crucial.

- ✓ **Algorithmic Bias**: Unjust targeting or exclusion may result from AI models that inherit biases from historical data.
- ✓ **Costs of Implementation**: Using AI in marketing necessitates a large financial and human investment.
- ✓ **Interpretability and Transparency**: Marketers' comprehension of decision-making procedures may be impeded by black-box AI models.

Future Trends and Research Directions:

The following developments are part of the anticipated future of AI-driven predictive analytics in marketing:

- Enhancing the transparency of AI decision-making is the goal of explainable AI (XAI).
- Using real-time data streams to improve dynamic marketing strategies is known as real-time predictive analytics.
- Voice and Visual Search Powered by AI: Using AI to recognize images and voices to forecast customer intent.
- Hyper-Personalization: delivering customized client experiences through deep learning.

Conclusion:

The revolutionary effects of AI-driven predictive analytics on marketing are highlighted in this review of the literature. Key findings show that AI solutions help with demand forecasting, optimize marketing budget, boost personalization, and improve consumer segmentation. But in order to fully utilize AI in predictive marketing, companies need to address issues like algorithmic bias, data protection, and implementation costs. Because AI-based prediction technologies facilitate data-driven decision-making, improving customer interactions and competitive advantages, the ramifications for marketing professionals are profound. Marketers must constantly adjust to new developments in AI while making investments in technology and talent development if they want to stay ahead in the ever-changing digital marketplace. Businesses that strategically incorporate these tools will be better equipped to predict client needs and propel marketing success as AI continues to advance

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Voice Search Optimization and User-Generated Content in the White Goods Industry: Pune Insights

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Abstract: This research paper aims to determine how voice search technology is being adopted in the Pune market, assess how user-generated content (UGC) influences brand perception, and show how these tactics can complement one another. Businesses can obtain a competitive edge by utilizing UGC to promote authenticity, trust, and voice search to adapt to contemporary consumer behaviours. User-generated content (UGC) and voice search optimization (VSO) are revolutionizing digital marketing by changing how companies interact with their clientele. The main emphasis of this study is the integration of white goods in Pune, India, a developing market with changing consumer behavior. The study illustrates how VSO and UGC may increase sales, consumer engagement, and brand visibility by examining trends and case studies. The advent of voice-enabled devices has revolutionized online searches by giving users a conversational and user-friendly way to access information. Voice search optimization offers white goods businesses the chance to enhance their online visibility and satisfy customers who want precise, quick answers. In addition, user-generated content (UGC) lends legitimacy through reviews, testimonials, and other shared information, which has a big impact on high-investment purchases. This study looks at the results and highlights how crucial it is for businesses hoping to prosper in a changing market to integrate VSO and UGC. White goods companies may improve their relationships with customers, foster trust, and spur long-term success by implementing these cutting-edge strategies. This study offers practical advice for successfully putting these tactics into practice in the Pune area.

Keywords: *-Voice Search Optimization, User Generated Content, Digital Marketing, White Goods Industry, Pune Regio etc,*

Introduction:

The technique of optimizing digital content and online presence to score highly in speech-based searches made with smartphones, smart speakers (like the Amazon Echo or Google Nest), or virtual assistants (like Siri or Google Assistant) is known as voice search optimization or VSO. VSO focuses on these distinctive features since voice queries are more conversational than typical text searches.

Key Features of VSO:

- **Conversational Tone:** When answering comprehensive queries, such as "What is the best washing machine in Pune?" the content should use natural, spoken language.
- **Long-Tail Keywords:** Focus on precise, in-depth terms that correspond with the way people inherently pose queries.
- **Content Based on Questions**: Provides direct answers to frequently asked questions, such as "How does an energy-efficient refrigerator work?"
- **Local SEO:** Provides precise company information to optimize for location-based queries (e.g. "Where can I buy an air conditioner near me?").
- **Structured Data:** For voice responses, schema markup guarantees that the content is easily comprehensible by search engines.
- **Mobile-Friendliness:** Guarantees responsive, quick-loading webpages for users on mobile devices.
- **Featured Snippets:** Voice assistants prefer succinct, straightforward responses that appear in "position zero," which is where they appear.

Benefits:

- **Increased Visibility**: Voice search results find your content more easily.
- **Better User Experience**: Offers quick, relevant answers to user queries.
- **Competitive Edge**: Early adopters stand out in a growing market.
- **Local Engagement**: Attracts nearby customers through precise, location-driven results.

Challenge:

- **Natural Language Complexity**: Adapting to varied ways users phrase queries.
- **Evolving Algorithms**: Staying updated on voice assistant ranking criteria.

- **Limited Results**: Voice search often delivers only one top answer, increasing competition.

Putting resources into VSO empowers organizations to adjust to the rising ubiquity of voice search, guaranteeing they stay pertinent in a computerized first world.

User Generated Content (UGC) refers to any type of content — like text, pictures, recordings, audits, or web-based entertainment posts — that individuals create and share, rather than brands or experts creating and sharing it. Consumers or clients of a product, service, or platform commonly create this content and often share it on public forums, social media, or review platforms. People value UGC for its credibility and reliability, as it reflects real-world opinions and experiences.

Common Types of UGC:

1. **Product Reviews and Ratings**: Feedback shared on e-commerce websites or review platforms.
2. **Testimonials**: Personal stories or endorsements shared by satisfied customers.
3. **Social Media Posts**: Photos, videos, or comments featuring a product or service, often tagged with brand mentions.
4. **Discussion Forums**: Contributions to online communities like Reddit or Quora discussing products or services.
5. **Video Content**: Unboxing videos, tutorials, or experience sharing on platforms like YouTube or TikTok.

Collaborative Contributions: Content created during brand-led initiatives like contests or campaigns.

Benefits of UGC:

1. **Authenticity and Trust**: People trust content created by other consumers more than traditional advertising.
2. **Engagement**: UGC drives interactions and builds community by involving real users in the brand conversation.
3. **Cost-Effective Marketing**: It leverages organic content without requiring extensive production costs.
4. **SEO and Traffic**: UGC often includes keywords, improving search rankings and driving traffic to websites or platforms.

5. **Social Proof**: Positive UGC serves as a powerful endorsement, influencing potential customers' purchase decisions.

Examples of UGC in Action:

- A customer posting a photo of their meal at a restaurant on Instagram.
- A user reviewing a new gadget on YouTube.
- A group participating in a hashtag challenge initiated by a brand on TikTok.
- Customers leaving feedback on Amazon or Yelp.

Brands may build stronger relationships with their audience, increase credibility, and boost exposure and engagement by promoting and utilizing user-generated content (UGC).

A fundamental part of contemporary metropolitan life is the white merchandise area, which produces necessities like forced air systems, clothes washers, and fridges. These gadgets' proficiency and straightforwardness have made them fundamental in homes everywhere. Because of mechanical progressions that have further developed item toughness, shrewd associations, and energy proficiency, this organization has seen huge change throughout the long term. These movements are firmly connected to moving buyer conduct, which is essentially affected by the fast reception of computerized advances and moving way-of-life assumptions.

The use of advanced apparatuses and shrewd innovation is adjusting client assumptions in Pune, one of India's dynamic and rapidly developing urban communities. Perhaps one of the greatest cities in India, Pune is home to a different populace that contains working-class families, educated youthful experts, and a rising number of rich residents. The wide variety of inclinations and wants that this client communicates makes Pune a microcosm of India's more extensive customer shift. The white merchandise business needs imaginative, super-advanced arrangements because of the city's quick urbanization and developing web utilization.

This change in how customers associate with brands and pursue buying choices is generally because of rising advanced patterns like voice search and client-produced content (UGC). Clients may handily adjust their choices, acquire item data, and complete exchanges thanks to Voice Search's conversational and easy-to-use interface. Nonetheless, the present clever buyers can connect with and trust client-created content (UGC, for example, virtual entertainment posts, online surveys, and tributes. Together, these assets give clients the data they need to frame about organizations and go with informed choices

These computerized developments further develop client connections as well as power

organizations to rethink and modify their promoting and functional methodologies. Organizations can decisively utilize voice inquiry improvement (VSO) and client-produced content (UGC) to expand commitment and trust by overcoming any issues on the web and disconnected customer encounters. In a city like Pune, where the white products industry is adjusting to a tech-driven purchaser base, these advances are turning out to be progressively huge parts of business procedure.

This examination researches how voice search and user generated content (UGC) cooperate to influence Pune's white merchandise market, taking a gander at what these components mean for promoting strategies, purchaser conduct, and the elements of the area by and large. The difficulties organizations face while carrying out these advances are likewise inspected, for example, keeping up with the authenticity of client-created content, guaranteeing consistent combination, and overseeing information security concerns. Taking a gander at these elements from the perspective of Pune's novel market qualities can give partners significant experiences in dealing with the continuous computerized change and meeting the moving requirements of current clients

Objectives of study :

- To investigate how Voice Search Optimization (VSO) affects consumer behavior in Pune's white goods sector.
- To examine how User-Generated Content (UGC) influences Pune consumers' opinions and level of trust in white goods brands.
- To look into how Pune-based white goods companies' marketing strategies incorporate voice search and user-generated content.
- To determine the obstacles and possibilities facing Pune-based white goods brands as they use voice search and user-generated content (UGC)-driven strategies

Scope of Study :

- **Geographical Focus** - The review will be topographically restricted to Pune, a metropolitan district in India known for its developing purchaser base and mechanical reception, especially in the white products portion.
- **Industry Focus** -The review centers only around the white merchandise industry, including home devices like fridges, clothes washers, climate control systems, and microwaves.
- **Consumer Behavior Analysis** of how purchasers in Pune use voice look for white merchandise, including examples, inclinations, and social changes impacted by this

innovation. Assessment of the effect of client produced content, like audits, appraisals, and tributes, on buy choices and brand reliability.

- **Business Strategy Insights-**Bits of knowledge Examination of flow promoting systems utilized by white products organizations in Pune to coordinate voice inquiry enhancement (VSO) and client created content (UGC). Investigation of inventive advertising approaches that adjust VSO and UGC to client commitment objectives.
- **Technological Adoption**-Assessment of the mechanical preparation and execution levels of VSO apparatuses and UGC stages among white merchandise brands in Pune.
- **Challenges and Opportunities** ID of obstructions, for example, specialized restrictions, buyer mindfulness holes, and cost factors, that prevent the reception of VSO and UGC. Featuring amazing open doors for white products organizations to use voice search and UGC for upgraded market entrance and client trust.
- **Comparative Framework** Similar bits of knowledge into brands that have effectively coordinated VSO and UGC with those slacking, zeroing in on examples learned and best practices.
- **Future Trends and Recommendations** Forecast of arising patterns in voice search and UGC reception in the white products industry. Vital proposals for organizations to amplify the advantages of these advancements while beating recognized difficulties

Literature Review :

Jha, A.K., Singhal, N. and Chhabra, A., (2024) Concluded the mobile market is unquestionably growing rapidly and will do so for some time to come. Costs are also falling as mass manufacturing rises and technology develops. In addition to their decreasing cost, the devices' processing power is increasing. As processing power and technology improve, people will begin to use assistants and stop typing. Voice assistants are becoming more and more commonplace. In addition to phones, voice home assistants such as Google Home and Alexa Home are now available. This leads to the conclusion that search engines will continue to improve themselves as voice search expands. Professionals in digital marketing who have not adjusted to this shift in behavior will be left behind and miss the next significant wave of the digital revolution.

Saeed, Z., et al (2024.) Stated that because voice search is expanding so quickly, websites are optimizing their content to rank higher. Research is necessary to comprehend the possibilities and ramifications of this new technology. Finding important SEO elements that improve webpage rankings for voice search queries on the Search Engine Results Page

(SERP) is the goal of this study. There are two stages to the research process: methodical data gathering and the identification of critical elements influencing SEO ranking. a long-term case study to evaluate these factors' effects. The relevance of selected features is assessed by experiments utilizing machine-learning methods, including Support Vector Machine, Logistic Regression, Naive Bayes, K-Nearest Neighbors, Decision Trees, and Random Forest. The new feature set (FF) performs noticeably better than the baseline models (EF and EFN), according to the results.

Runaite, D., (2021) in recent years, voice assistants have become more and more popular all over the world. More companies are using voice assistants. Consequently, there is an increase in user-voice assistant interactions. Consumer behavior analysis showed whether voice search optimization should be a top priority for businesses and how it affects those that are already voice-optimized. It appears that most respondents use voice search to seek up random facts, listen to music, and check the weather before getting directions. This would suggest that the companies who stand to gain the most by instantly making their websites voice search-friendly are shops, followed by entertainment companies. These numbers, however, are far smaller than those of people who use their voice search devices for private purposes. People are reluctant to use these voice assistants for shopping because of their limitations. Businesses that have already optimized for voice search or intend to do so would be subject to limitations as a result.

Xamroyev Doston, D. and Beknazarova, S.S., (2022) examined that speech commerce is an artificial intelligence-based technology that enables customers to shop using only their speech and a smart device, such as a smartphone or smart speaker. Conversational AI makes daily chores easier. Customers can use their voice to locate the item they need, place an order, pay for it, monitor it, and provide feedback when it arrives, according to merchants. They can reorder their things at a later time by using their purchasing history. Additionally, it applies to both physical and online stores. Before 2022, voice-activated shopping was already widely accepted and well liked.

Wlömert, N., Papies, D., Clement, M. and Spann, M., (2024) found that regulating user-generated content (UGC) platforms like YouTube is a topic of discussion among businesses, rightsholders (particularly in the music industry), and legislators in the US and EU. These platforms are now immune from liability for copyright-infringing content due to safe harbor protections, which means that rightsholders receive meager compensation. It's unclear, though, if altering these rules would affect user demand for higher-payout services like Spotify and whether user-generated content (UGC) platforms would increase or decrease

demand. This study looks at a quasi-experiment where songs were made available on YouTube as user-generated content (UGC) following a deal with the German royalty collecting society. The results of an analysis of data on 600,000 songs by 38,000 artists show that, although UGC increases demand for the majority of songs on other streaming platforms, it cannibalizes revenue for recent and popular releases, resulting in an overall negative

C. Thompson et al (2024) Stated that Despite doubts regarding its provenance and accuracy, legal practitioners frequently use Wikipedia articles that summarize court decisions. According to a randomized control trial on Irish judicial decision-making, Wikipedia entries greatly raise the possibility that relevant cases would be cited as precedents, especially by judges of the High Court. The wording of judgments is also influenced by the language used in these articles. Higher courts do not exhibit these effects, indicating that increased reliance on Wikipedia is a result of time constraints. Despite conventions that discourage its usage, this study demonstrates the significant impact of user-generated content on high-stakes legal decisions.

Research Methodology :

Research Design :

This study utilizes a mixed method approach combining quantitative surveys and qualitative interviews to accumulate experience into buyer conduct and marketing strategies adopted by white goods industry in Pune. The target population comprises shoppers from Pune region who have as of let bought or thought about buying of consumer durables from speciality stores or company showroom in Pune. The Target population also includes sales persons of different organizations who are involved in facilitating buying decision. This study comprehensively analyses the impact of VSO & UGC in the consumer durable industry in Pune.

Primary Data :

Survey Method- structured method is used to collect primary data.

In-depth Interview – Interviews are conducted with sales/ Marketing/ manager of speciality stores are conduced to get more insights about inbound marketing practices adopted by consumer durable selling organization.

Secondary Data :

- Reviews and ratings on e-commerce platforms.
- UGC on social media and brand websites.
- Industry reports and white papers on voice search trends and UGC.

Sampling Technique :

a. The review will target 300 shoppers who have made a new white merchandise buy in Pune. A determination of 10 showcasing supervisors from driving white merchandise organizations will be evaluated to grasp the execution of VSO and UGC in their promoting techniques.
b. Sampling Technique- Simple Random Sampling for consumers and purposive sampling technique for industry professionals
c. Sampling Frame- Pune City
d. Sampling Unit- customers those who are buying from speciality stores or company showroom.

Data Analysis- SPSS (Version)

Quantitative Analysis:

- Use **descriptive statistics** (means, frequencies) to summarize consumer survey data.
- Employ **inferential statistics** (correlation, regression) to analyze

Qualitative Analysis:

- Apply **thematic analysis** to identify recurring patterns and insights from interviews and UGC content.
- Use **sentiment analysis tools** to evaluate consumer opinions in UGC (reviews and social media posts).

Tools and Techniques:

- **Survey Tools:** Google Forms, Survey Monkey, or similar platforms.
- **Data Analysis Software:**
    - **SPSS (Version 25)**
    - **NVivo** or **Atlas.ti** for qualitative analysis.
    - Sentiment analysis using tools like **Monkey Learn** or **Lexalytics**

Ethical Contemplations:

- Acquire informed assent from all review members and interviewees.
- Guarantee information classification and secrecy.
- Utilize auxiliary information just from freely accessible sources to keep away from moral worries.

Reference Method- APA

Results & Discussion :

Demographic profile of the Population

Gender					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	115	46.0	46.0	46.0
	Female	135	54.0	54.0	100.0
	Total	250	100.0	100.0	

Age					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 18 years	45	18.0	18.0	18.0
	18 to 25 Years	58	23.2	23.2	41.2
	26 to 33 Years	77	30.8	30.8	72.0
	34 to 42 Years	31	12.4	12.4	84.4
	Above 43 Years	39	15.6	15.6	100.0
	Total	250	100.0	100.0	

Education					
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Undergraduate	42	16.8	16.8	16.8
	Graduate	80	32.0	32.0	48.8
	Postgraduate	80	32.0	32.0	80.8
	Others	48	19.2	19.2	100.0
	Total	250	100.0	100.0	

Gender Distribution

- Male participants: 115 (46%)
- Female participants: 135 (54%)
- Total sample size: 250 (100%)

This shows a balanced gender distribution with slightly more female participants than male participants do.

Age Distribution

- Below 18 years: 45 participants (18%)
- 18 to 25 years: 58 participants (23.2%)
- 26 to 33 years: 77 participants (30.8%)
- 34 to 42 years: 31 participants (12.4%)

- Above 43 years: 39 participants (15.6%)

The age distribution indicates that the largest age group is 26 to 33 years (30.8%), followed by 18 to 25 years (23.2%). When combined, almost 72% of participants are under 34 years old, suggesting a relatively younger sample population. The smallest age group is 34 to 42 years (12.4%).

- Education Level
- Undergraduate: 42 participants (16.8%)
- Graduate: 80 participants (32%)
- Postgraduate: 80 participants (32%)
- Others: 48 participants (19.2%)

The education distribution shows that 64% of participants have either graduate or postgraduate degrees, indicating a highly educated sample. Only 16.8% are at the undergraduate level, while 19.2% fall into the "Others" category, which might include those with vocational training, high school education, or other qualifications.

The sample consists of 250 participants with a slight female majority. The participants are predominantly young adults (most between 18-and 33 years) and well-educated (majority with graduate or postgraduate degrees). This demographic profile suggests a sample that is somewhat skewed toward younger, highly educated individuals, which may have implications for the generalizability of any findings derived from this data, depending on what the study aims to investigate.

Scale: ALL VARIABLES

Case Processing Summary

		N	%
Cases	Valid	250	100.0
	Excluded	0	.0
	Total	250	100.0

a. List wise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.852	.844	20

Cronbach's Alpha is a measure of internal consistency reliability that indicates how closely related a set of items are as a group. The value of 0.852 indicates:

1. **Good Internal Consistency**: Generally, researchers consider alpha values above 0.8 good. Your value of 0.852 suggests that the 20 items in your scale consistently measure the same underlying construct.
2. **Standardized vs. Non-standardized**: The slight difference between the regular alpha (0.852) and standardized alpha (0.844) suggests your items may have some minor variance in their standard deviations. The standardized alpha equalizes these differences, while the regular alpha works with the actual variances.
3. **Scale Reliability**: With this alpha value, you can confidently rely on your 20-item scale to measure whatever construct you designed it to assess.

Factor Analysis Results

Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	6.777	33.887	33.887	6.777	33.887	33.887	5.146	25.732	25.732
2	4.780	23.899	57.786	4.780	23.899	57.786	4.013	20.067	45.800
3	3.911	19.554	77.339	3.911	19.554	77.339	4.007	20.035	65.835
4	3.088	15.440	92.780	3.088	15.440	92.780	4.005	20.025	85.860
5	1.444	7.220	100.000	1.444	7.220	100.000	2.828	14.140	100.000
6	9.311E-16	4.655E-15	100.000						
7	4.991E-16	2.495E-15	100.000						
8	2.220E-16	1.110E-15	100.000						
9	2.220E-16	1.110E-15	100.000						
10	2.220E-16	1.110E-15	100.000						
11	2.220E-16	1.110E-15	100.000						
12	2.113E-16	1.057E-15	100.000						
13	6.383E-17	3.192E-16	100.000						
14	-2.220E-16	-1.110E-15	100.000						

15	-2.220E-16	-1.110E-15	100.000						
16	-2.220E-16	-1.110E-15	100.000						
17	-2.370E-16	-1.185E-15	100.000						
18	-3.948E-16	-1.974E-15	100.000						
19	-5.273E-16	-2.636E-15	100.000						
20	-4.000E-15	-2.000E-14	100.000						

Extraction Method: Principal Component Analysis.

Component Matrix[a]

	Component				
	1	2	3	4	5
Voice search has an impact on my choice to buy white goods	.402	-.612	-.225	.640	.055
I'm more inclined to look into white goods companies whose content is optimized for voice search.	.752	.297	.095	-.111	.570
I mostly utilize voice search to compare and review products before buying white goods	.032	.811	.160	.554	-.096
Voice search, in my opinion, yields better-individualized results for my white goods needs.	.032	.811	.160	.554	-.096
I frequently use voice search to look up information about white goods products	.752	.297	.095	-.111	.570
Voice search makes it easier for me to find information about white goods than more traditional search methods	.402	-.612	-.225	.640	.055
I trust voice search results while looking for white goods models or brands..	.032	.811	.160	.554	-.096
Voice search is more useful when choosing which white goods to purchase	.032	.811	.160	.554	-.096
I like to use voice assistants like Google Assistant or Siri while comparing white goods products.	.402	-.612	-.225	.640	.055

When I'm looking for white products online, voice search helps me save time.	.402	-.612	-.225	.640	.055
When I'm looking for white products online, voice search helps me save time	.930	.001	.159	-.168	-.286
Voice search has an impact on my choice to buy white goods.	.752	.297	.095	-.111	.570
I mostly utilize voice search to compare and review products before buying white goods.	.930	.001	.159	-.168	-.286
Voice search, in my opinion, yields better-individualized results for my white goods needs.	.930	.001	.159	-.168	-.286
In the white goods industry, user-generated material offers more truthful insights than conventional advertising.	.930	.001	.159	-.168	-.286
Before deciding to buy white goods, I actively look for user-generated content (such as reviews and social media posts).	.930	.001	.159	-.168	-.286
Voice search optimization is increasingly being used by white goods companies in their marketing, I've found.	-.165	-.311	.929	.104	.048
In my opinion, white goods companies should incorporate user-generated content and voice search optimization into their marketing plans.	-.165	-.311	.929	.104	.048
I find white goods companies that combine user-generated content and voice search optimization to be more reliable.	-.165	-.311	.929	.104	.048
I'm more inclined to interact with white goods companies whose marketing strategies leverage voice search and user-generated content.	-.165	-.311	.929	.104	.048
Extraction Method: Principal Component Analysis.					
a. 5 components extracted.					

Rotated Component Matrix[a]					
	Component				
	1	2	3	4	5
Voice search has an impact on my choice to buy white goods	.109	-.086	.990	-.008	.013
I'm more inclined to look into white goods companies whose content is optimized for voice search.	.371	.103	.015	-.064	.921
I mostly utilize voice search to compare and review products before buying white goods	-.007	.994	-.086	-.027	.069
Voice search, in my opinion, yields better-individualized results for my white goods needs.	-.007	.994	-.086	-.027	.069
I frequently use voice search to look up information about white goods products	.371	.103	.015	-.064	.921
Voice search makes it easier for me to find information about white goods than more traditional search methods	.109	-.086	.990	-.008	.013
I trust voice search results while looking for white goods models or brands..	-.007	.994	-.086	-.027	.069
Voice search is more useful when choosing which white goods to purchase	-.007	.994	-.086	-.027	.069
I like to use voice assistants like Google Assistant or Siri while comparing white goods products.	.109	-.086	.990	-.008	.013
When I'm looking for white products online, voice search helps me save time.	.109	-.086	.990	-.008	.013
When I'm looking for white products online, voice search helps me save time	.968	-.009	.105	-.013	.227
Voice search has an impact on my choice to buy white goods.	.371	.103	.015	-.064	.921
I mostly utilize voice search to compare and review products before buying white goods.	.968	-.009	.105	-.013	.227
Voice search, in my opinion, yields better-individualized results for my white goods needs.	.968	-.009	.105	-.013	.227

In the white goods industry, user-generated material offers more truthful insights than conventional advertising.	.968	-.009	.105	-.013	.227
Before deciding to buy white goods, I actively look for user-generated content (such as reviews and social media posts).	.968	-.009	.105	-.013	.227
Voice search optimization is increasingly being used by white goods companies in their marketing, I've found.	-.014	-.027	-.008	.999	-.043
In my opinion, white goods companies should incorporate user-generated content and voice search optimization into their marketing plans.	-.014	-.027	-.008	.999	-.043
I find white goods companies that combine user-generated content and voice search optimization to be more reliable.	-.014	-.027	-.008	.999	-.043
I'm more inclined to interact with white goods companies whose marketing strategies leverage voice search and user-generated content.	-.014	-.027	-.008	.999	-.043
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					
a. Rotation converged in 5 iterations.					

Component Transformation Matrix

Component	1	2	3	4	5
1	.815	.029	.312	-.130	.471
2	.013	.744	-.560	-.286	.224
3	.184	.162	-.227	.939	.080
4	-.220	.629	.728	.119	-.106
5	-.504	-.150	.088	.074	.843
Extraction Method: Principal Component Analysis. Rotation Method: Varimax with Kaiser Normalization.					

This appears to be a Principal Component Analysis (PCA) of a survey measuring attitudes toward voice search and user-generated content to white goods purchases. Let me break down the key findings:

Extraction Information

- 5 components were extracted, explaining 100% of the variance
- The first component explains 33.89% of the variance
- The second component explains 23.90% of the variance
- The third component explains 19.55% of the variance
- The fourth component explains 15.44% of the variance
- The fifth component explains 7.22% of the variance

Component Structure after Rotation

The rotated component matrix shows clear factor loadings that allow us to identify what each component represents:

Component 1: User-Generated Content and Personalization

- High loadings (0.968) for items about:
    - Finding voice search helpful for saving time
    - Comparing and reviewing products with voice search
    - Believing voice search yields better-individualized results
    - Valuing user-generated content as more truthful than conventional advertising
    - Actively seeking user-generated content before purchasing white goods

This component represents consumers who highly value user-generated content and personalized information when making purchasing decisions.

Component 2: Voice Search Trust and Utility

- Very high loadings (0.994) for items about:
    - Utilizing voice search to compare products
    - Trusting voice search results for white goods models or brands
    - Finding voice search more useful when choosing which white goods to purchase
    - Believing voice search provides better-individualized results

This component represents trust in voice search as a useful tool for purchase decisions.

Component 3: Voice Search Convenience

- Very high loadings (0.990) for items about:
    - Voice search impacting purchase choice
    - Voice search making it easier to find information than traditional methods

- Using voice assistants like Google Assistant or Siri for comparisons
- Voice search helping save time

This component focuses on the convenience and timesaving aspects of voice search.

Component 4: Voice Search and Marketing

- Extremely high loadings (0.999) for items about:
  - Voice search optimization being used by white goods companies
  - Believing companies should incorporate user-generated content and voice search
  - Finding companies that combine these approaches more reliable
  - Being more inclined to interact with companies using these strategies

This component represents awareness and preference for companies that incorporate voice search in their marketing.

Component 5: Voice Search Information Seeking

- High loadings (0.921) for items about:
  - Being inclined to look into companies whose content is optimized for voice search
  - Frequently using voice search to look up information about products
  - Voice search impacting purchase decisions

This component focuses on proactive information-seeking behavior using voice search.

Interpretation and Implications

1. **Distinct Consumer Attitudes**: The analysis identifies five distinct aspects of consumer behavior and attitudes toward voice search in the white goods market.
2. **Voice Search Adoption**: The results indicate that voice search is integrated into multiple aspects of the consumer journey, from information gathering to final purchase decisions.
3. **Marketing Implications**: Companies selling white goods should consider:
   - Optimizing content for voice search
   - Incorporating user-generated content in their strategies
   - Leveraging voice search for both convenience and personalization
   - Building trust in their voice search results

4. **Strong Pattern Identification**: The very high factor loadings (many above 0.90) suggest these components are strongly defined and clearly differentiated.
5. **Complete Variance Explanation**: The five components fully explain the variance in the data (100% cumulative), indicating the analysis has captured all meaningful patterns in the responses.

Findings:

- **High Internal Consistency:** The scale demonstrates high internal consistency reliability, with a Cronbach's alpha of 0.852, indicating that the 20 items in the scale consistently measure the same underlying construct.
    - **Factor Analysis:** The factor analysis revealed five distinct components, explaining 100% of the variance. These components represent different facets of consumer attitudes towards voice search and user-generated content in the context of white goods purchases.
        - **Component 1:** Focuses on the value of user-generated content and personalized information.
        - **Component 2:** Centers on trust and utility of voice search.
        - **Component 3:** Emphasizes the convenience and time-saving aspects of voice search.
        - **Component 4:** Highlights the importance of voice search in marketing strategies.
        - **Component 5:** Focuses on proactive information-seeking behavior using voice search.
- **Clear Component Structure:** The rotated component matrix showed very high factor loadings, suggesting that the identified components are strongly defined and clearly differentiated.
- **Voice Search Adoption:** Voice search is integrated into various stages of the consumer journey, from initial information gathering to final purchase decisions.
- **Sample Demographics:**
    - The sample consisted of 250 participants, with a slight majority of females (54%).
    - The age distribution was skewed towards younger adults, with approximately 72% of participants being under 34 years old.

- The sample was highly educated, with 64% holding graduate or postgraduate degrees.

Recommendations:

- **Emphasize User-Generated Content:** Given the high value consumers place on user-generated content, companies should actively encourage and showcase customer reviews, testimonials, and social media posts.
- **Build Trust in Voice Search:** Companies should focus on building trust in voice search results by ensuring accuracy, reliability, and relevance of information provided through voice platforms.
- **Optimize for Convenience:** Highlighting the convenience and time-saving aspects of voice search can attract more consumers to use this technology for their purchases.
- **Integrate Voice Search in Marketing:** Companies should incorporate voice search optimization into their marketing strategies to enhance visibility and engagement with potential customers.
- **Target Younger, Educated Audience:** The sample consisted mainly of young, educated individuals, suggesting that marketing efforts should be tailored to this demographic.

Conclusion:

The provided demographic data and survey analysis offer several insights into the characteristics of the study participants and their perspectives on voice search and user-generated content in the context of white goods purchases.

Demographic Profile

The sample comprises 250 participants, predominantly female (54%) and young, with 72% aged between 18 and 33. A significant majority (64%) hold graduate or postgraduate degrees, indicating a well-educated demographic. This profile suggests a tech-savvy and informed group, likely early adopters of digital tools like voice search.

Voice Search and User-Generated Content

The survey explored attitudes toward voice search and the role of user-generated content in the white goods purchasing process. Key findings include:

- High Trust in Voice Search: Participants generally trust voice search for comparing products, reviewing information, and making purchase decisions. They find it convenient and time-saving.
- Value of User-Generated Content: There is a strong preference for user-generated content (like reviews and social media posts) over traditional advertising. Participants believe it offers insights that are more truthful and actively seek it before purchases.
- Voice Search as a Marketing Tool: Participants recognize the growing use of voice search optimization by white goods companies. They believe companies should integrate voice search and user-generated content into their marketing strategies, viewing those who do as more reliable.
- Personalization Preference: There is a clear preference for personalized shopping experiences. Participants feel voice search provides better-individualized results and value content tailored to their needs.

Implications:

These findings suggest that voice search is becoming an integral part of the consumer journey for white goods, from initial research to final purchase. User-generated content plays a crucial role in building trust and influencing decisions. Companies should focus on:

- Optimizing for Voice Search: Ensure their content is easily accessible and understandable through voice search.
- Leveraging User-Generated Content: Encourage and display customer reviews and social media content.
- Building Trust: Focus on providing accurate, reliable information through voice search.
- Personalization: Tailor content and search results to individual preferences.

Limitations:

The study's limitations include a potentially skewed sample composition that was predominantly young, educated, and slightly more female than the general population. This demographic imbalance raises significant concerns about the generalizability of the findings to broader consumer segments, particularly older adults, individuals with lower educational attainment, and male consumers who may exhibit different purchasing behaviors and

information-seeking patterns. The overrepresentation of certain demographic groups could mask important variations in consumer preferences across different population segments.

Additionally, the study's reliance on self-reported data introduces several potential biases that may affect the validity of the results. Participants might have engaged in social desirability responding, overstating their use of technologies they perceive as advanced or understating behaviors they consider less socially acceptable. Recall bias could also be present, as respondents may inaccurately remember or report their past purchasing decisions and information sources. Without objective behavioral measures to corroborate self-reports, it remains unclear whether stated preferences accurately reflect actual consumer behavior in real purchasing situations.

Overall, the study indicates the growing importance of voice search and user-generated content in the white goods market. Companies that adapt to these trends by optimizing their content and strategies are likely to gain a competitive advantage. To capitalize on these findings, businesses should consider developing voice-optimized content that addresses common consumer queries and concerns. Additionally, encouraging and strategically leveraging authentic customer reviews and testimonials could significantly influence purchasing decisions, as consumers increasingly trust peer recommendations over traditional marketing. Despite the noted limitations, the identified trends warrant attention from industry stakeholders seeking to enhance their market positioning in the evolving consumer appliance landscape.

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The Impact of Artificial Intelligence on Digital Marketing

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Abstract: This paper explores the transformative role of Artificial Intelligence (AI) in digital marketing. It examines the applications, benefits, challenges, and future trends of AI in this field, providing insights for marketers and businesses. Artificial intelligence (AI) has significantly impacted digital marketing, revolutionizing customer insights, personalization, predictive analytics, and automation. By utilizing AI algorithms, companies may make use of enormous quantities of data to obtain insightful understanding about their customers & spot emerging trends and patterns that were previously hard to spot.

This allows for precise customer segmentation and targeted marketing campaigns, increasing customer engagement and conversion rates. Businesses may anticipate emerging patterns, make data-driven decisions, and maximize marketing tactics with the help of AI-powered predictive analytics. Artificial intelligence (AI) systems can spot trends in past data, helping companies make effective resource allocation decisions and maintain their competitive edge.

Additionally, AI automation streamlines marketing operations, automating repetitive tasks and improving efficiency. AI-powered chatbots provide instant and personalized customer service, reducing response times and enhancing satisfaction. Content generation tools driven by AI automate the creation of engaging and relevant content, saving time and resources for marketers.

However, ethical considerations and privacy concerns must be addressed when implementing AI in digital marketing. Maintaining transparency, responsible data usage, and ensuring user privacy are vital to establish and maintain trust with customers.

Keywords: *Artificial Intelligence (AI), Digital Marketing, Predictive Analytics, Decision Making etc.*

Introduction:

Artificial Intelligence : Artificial Intelligence (AI) is revolutionizing the landscape of digital marketing, offering unprecedented opportunities for businesses to understand and engage with their customers in more personalized and effective ways. This study aims to explore the

impact of AI on digital business, focusing on its applications, benefits, challenges, and limitations. In recent years, AI has emerged as a powerful tool for marketers, enabling them to analyse vast amounts of data, personalize customer experiences, and optimize marketing campaigns with greater precision.

This research addresses this gap by examining the practical applications of AI in digital marketing and its implications for marketers. In particular, current key concepts that need to be redefined have been spotted, as well as challenges in the digital marketing sector that need to be tackled with regards, especially, to social media and mobile marketing.

Digital marketing refers to the process of promoting products and services through digital channels, while Search Engine Optimization is the practice of optimizing a website to increase organic web traffic and achieve higher rankings in search engine results pages.

Lastly, Social Media Marketing is a transformational tool that has resulted in significant changes in the business world.

A new structured approach is proposed on how businesses can stay up to date, exploiting the advantages, while minimizing the effects of disadvantages, of an almost inescapable decision to adopt, develop and implement a Digital Marketing Strategy. Future in marketing seems to embrace augmented and virtual reality as it's natural progression, therefore, technology along with development and adoption of specific organizational capabilities and management tools respectively, integration of robust business processes, such as effective media derived data conversion and resource transformation exchange, and certainly, acquisition of invaluable human expertise, provide a solid basis for businesses to stay competitive in a fast changing and challenging marketplace.

Artificial intelligence (AI)-driven technologies, such machine learning, natural language processing, and predictive analytics, have made it possible for companies to analyse enormous volumes of data, spot trends and insights, and automate labour-intensive, manual processes. Artificial intelligence (AI) is a set of technologies that enable computers to perform a variety of advanced functions, including the ability to see, understand and translate spoken and written language, analyze data, make recommendations, and more. AI uses algorithms to simulate human intelligence.

AI uses data to learn and improve its performance. The capacity to personalize data and encounters for certain customers is one among the major positive aspects of AI in marketing via the web. AI algorithms may provide customized material as well as targeted marketing efforts that are appealing to certain demographics through assessing information about consumer behaviour, preferences, and past purchase. Increased client loyalty, engagement, &

conversion rates may result via this.

The possibility of AI to automate time-consuming and routine tasks like data entry, reporting, and refinement have a significant impact on digital marketing as well.

This gives marketers more time to devote to creative thinking, strategic planning, and cultivating client relationships. Furthermore, chat bots and virtual personal assistants powered by AI may supply round-the-clock customer service, enhancing the overall customer experience. All things considered, artificial intelligence is completely changing the field of digital marketing by giving companies new and efficient methods to increase revenue, simplify operations, and enhance consumer interaction. In the years to come, AI technology is anticipated to play a gradually wider role in online advertising plans as it develops.

Digital Marketing : In digital marketing, AI focuses on lead conversion and user retention. Interactive website design, smart email marketing, insightful conversations and other digital marketing services can help you drive users towards your business goals.

The impact of AI on digital marketing will be determined by many factors. Machine learning (ML), a subset of AI, teaches computer programs that can collect data and use it to learn about itself. We collect information from various sources, including websites, online reviews, menus and social media accounts. AI uses data to create and deliver tailored content to viewers.

Artificial intelligence technology enables comprehensive online research for restaurants and customers. By using AI in their marketing plans, businesses can provide them with more data and connect with potential customers at better times. Through social networks such as Facebook and Instagram and artificial intelligence for advertising on digital platforms, marketing provides a unique and enjoyable experience for consumers digital. These platforms review user data before making offers that meet the user's needs.

AI can also help marketers predict and spot trends.This will ensure your money is spent and prevent your business from being overwhelmed by digital advertising. The digital marketing sector has been greatly impacted by artificial intelligence (AI), which has changed how companies engage with their clientele and opened up new avenues for data-driven and tailored marketing campaigns. In order to enhance their marketing campaigns and reach the correct demographic with an appropriate information the ideal moment, organizations are able to use artificial intelligence (AI) solutions that recognize trends and patterns that were formerly hard to detect. Artificial Intelligence is changing digital marketing in a variety of methods, from chatbot to predictive analytics.

Artificial intelligence systems in digital marketing can identify what is most likely to drive

users back to your website based on historical data.
AI determines which customers will unsubscribe from a service and analyzes general subscriber characteristics. These statistics help marketers plan their next campaign and strategize to encourage people to stick around.

Need of Study:

The aim of this study is to determine the Impact of AI in digital marketing. It will contribute to the theories already existing about the topic of AI in digital marketing and how it's impacting marketing.

This study seeks to evaluate how companies utilize AI to enhance performance by investigating the impact of AI on digital marketing

Research Objective:

1. To analyse the influence of artificial intelligence and its uses in digital marketing
2. To determine how companies utilize it to improve their performance.
3. To analyse the role of AI-powered chatbots and virtual assistants in providing personalized customer support and improving engagement.

Research Question: How does AI affect digital marketing?

Scope and Significance of the Study

1. This study will primarily investigate the application of AI analytics in customer targeting, personalization, engagement, data-driven insights, automation, and efficiency.
2. The research will encompass common AI techniques like machine learning, natural language processing, and predictive modelling employed in digital marketing.
3. This study consists of the most pertinent and valuable knowledge about Artificial intelligence's relationship to digital marketing
4. The study is focused on artificial intelligence, machine learning, big data, and digital marketing in particular.

Application use in Artificial Intelligence (AI) :

Artificial Intelligence (AI) Artificial intelligence is the concept and development of computer systems that can do activities that would ordinarily need human intelligence.

Visual recognition, voice recognition, making difficult decisions on challenging problems, and the ability to interpret languages are all examples. (Oxford University press, 2019).

Machine Learning (ML) is the ability of a computer to learn from raw data instead of being given commands by humans. This means that machines can discover patterns and derive important information from the data they collect from their detectors. (Buller, Gifford, &

Mills, 2018.)

Deep Learning (DL): Deep learning is a kind of machine learning that leverages neural networks to carry out difficult tasks including speech recognition, image recognition, and language processing.

Natural Language Processing (NLP): The goal of the processing of natural language (NLP), a branch of artificial intelligence, is to permit machines to comprehend, translate, and produce human language.

Robotics: In robotics, intelligent machines that are capable of carrying out manual activities like material handling, surgery, and production activities are created.

Expert Systems: Expert systems are artificial intelligence (AI) models that simulate human decision making in a certain sector.

Search Engine Optimization (SEO) is the procedure of filtering a website using on-page and off-page methods for it to be indexed and categorized effectively by search engines like Google, Bing, and others. It takes a lot of effort to get a successful and organic listing in a search engine results page. (Dodson, 2016).

Content creation:

Artificial Intelligence is producing entire articles, social media posts, and product descriptions. AI-enabled content production tools can save companies.

Chatbots :

In digital marketing platforms, chatbots are artificial intelligence is software based programs that provide customers with instructions on how to interpret human actions and trigger conversational questions in natural language. In addition to being used for conversations, chatbots are also used by professionals in established fields such as doctors and lawyers. In addition to other human rights issues, classification, civil liability, consumer protection, cybersecurity, privacy and data protection, and intellectual property rights (IPR) are considered.

Personalized Advertising :

Digital marketing is different from the way AI has changed other industries. Personalized ads are offers designed for each individual customer and placed alongside website content to integrate with the website they are viewing. Personal advertising allows companies to reach customers with relevant offers.

Social media marketing:

Websites like Facebook, Instagram, and Twitter are still crucial digital marketing channels. Companies use social media to interact with customers, increase website traffic, and establish

recognition for their brands.

Predictive analytics:

By using AI-powered predictive analytics, businesses may use information about clients to make more informed decisions. Forecasting sales more accurately, determining which marketing tactics work best, and tailoring the customer experience to each individual client's demands are all made possible by predictive analytics.

Literature Review :

The study's aim is to expose towards the fundamental ideas of AI and to acquaint them with AI that is machine learning, deep learning and digital marketing. The data gathered over the last two decades is a great asset for the youth of today. Despite the fact that professionals may be unaware of the possibilities that data could have offered to organizations, data now begins the daily operations of enterprises.

Artificial Intelligence (AI) has emerged as a transformative force in reshaping various industries, and digital marketing is no exception. This literature review explores the significant impact of AI on enhancing digital marketing strategies, focusing on key themes such as personalization, predictive analytics, automation, and customer experience.

Digital Marketing :

The terminology "digital marketing" refers to the practice of promoting products and services using digital platforms like internet web pages, mobile devices, social networking sites, search engines, and other related platforms which are all used in the marketing of products and services.

When the internet was first introduced in the 1990s, digital marketing quickly gained popularity. (Baron, 2022). Digital marketing concepts are comparable to traditional marketing concepts, and it is generally seen as a fresh way for companies to engage with consumers and better understand their behaviour and also traditional and digital marketing tactics are frequently used in tandem by businesses in their marketing plans and campaigns. (Baron, 2022).

Understanding the Role of AI in Digital Marketing :

AI plays a crucial role in the digital marketing industry, revolutionizing marketing strategies and consumer behaviour studies. By leveraging AI, businesses can employ data-driven marketing strategies, target specific consumer segments, and personalize marketing communication. AI applications in digital marketing encompass content marketing, social media marketing, email marketing, and marketing communication. Understanding the role of AI in digital marketing is vital for professionals looking to make a significant impact in this

dynamic industry.

Predictive Analytics for Data-Driven Decision-Making:

Businesses may now make data-driven decisions and more accurate predictions of future trends thanks to AI-driven predictive analytics. Artificial intelligence (AI) computers analyse past data to find patterns and forecast consumer behaviour, industry trends, and campaign results. As a result, companies may effectively manage resources, maximize marketing tactics, and outperform rivals.

Value of AI in Marketing :

The marketing interview participants assert that the AI has helped save time and facilitated learning from processed data, thus providing the potential to grow. Modern marketing necessitates a thorough understanding of clients' desires and interests, as well as the ability to act quickly and effectively on that information. The majority of organizations who do not use AI in their marketing are unable to make data-driven decisions in real time.

Key Applications of AI in Digital Marketing :

AI's impact on digital marketing extends to transforming social media analytics, shaping global marketing management strategies, and reshaping content marketing. It serves as a strategic management tool for top companies, creating valuable connections while revolutionizing digital media applications. These advancements demonstrate how AI is revolutionizing the way companies approach marketing, offering insights, and optimizing strategies that were previously unattainable.

How AI is Shaping Digital Marketing Strategies

AI's impact on digital marketing strategies is profound. By enabling personalization and predictive analysis, AI tailors marketing efforts to individual consumer behaviours. Chatbots, powered by AI, enhance customer service with 24/7 interaction. In SEO and content marketing, AI influences search engine algorithms and aids in content creation and curation. Social media marketing benefits from AI-driven social listening tools and targeted advertising. Furthermore, AI optimizes email marketing and CRM through content and timing optimization and predictive customer analytics.

Chatbots and Customer Service

Reshaping digital marketing degree programs, AI applications are revolutionizing strategies in social media marketing analytics and email marketing. Providing valuable connections in the corporate world, AI in the digital marketing landscape is transforming career opportunities.

The Impact of AI on SEO and Content Marketing :

AI has greatly impacted SEO and content marketing strategies. Its ability to analyze vast amounts of data and recognize patterns has revolutionized keyword research and content optimization. AI-powered tools can identify user intent, enabling the creation of more relevant and valuable content. Moreover, AI enhances personalized recommendations and dynamic content creation, improving user experience and engagement.

In content marketing, AI analyzes consumer behaviour to deliver targeted and compelling content. AI's influence on SEO and content marketing is undeniable, shaping the way businesses optimize their online presence for better visibility and user engagement.

AI and Search Engine Algorithms :

AI applications in digital marketing have revolutionized the understanding of user interactions. These advancements pave the way for career progression and skill enrichment in digital marketing strategies.

With a focus on social media marketing analytics, AI plays a pivotal role in deciphering consumer trends. Additionally, AI has created invaluable connections in email marketing, refining targeting, and personalization strategies.

AI and Social Media Marketing :

Social media marketing is evolving with AI, enhancing consumer engagement, and targeting. AI-powered social listening tools analyze vast data sets to understand consumer behaviour and sentiments, aiding in crafting personalized strategies for different segments.

AI in Content Creation and Curation :

AI in the digital marketing landscape offers strategic management opportunities by providing valuable connections in data analytics. It comprehensively understands digital media and reshapes consumer behaviour studies. The incorporation of AI applications in the digital marketing landscape brings innovation to content creation and curation, ensuring that businesses stay ahead in the ever-evolving digital space.

AI for Targeted Advertising

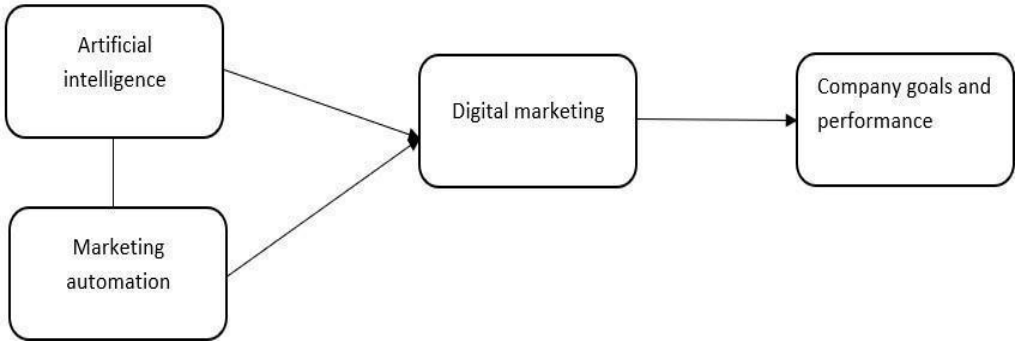
With AI algorithms optimizing ad targeting, marketing communication becomes more efficient. Personalized content offered by AI-powered targeted advertising enhances consumer engagement, improving marketing strategies in digital marketing.

AI in Email Marketing and CRM :

- Harnessing the Power of AI in Email Marketing and CRM
- Utilizing AI for Email Content and Timing Optimization
- AI for Predictive Customer Analytics

Conceptual Model

Figure 1: Conceptual model



The conceptual model above shows the relationship between AI and marketing automation, digital marketing and company goals and performance. The model depicts a relationship between artificial intelligence, market automation and digital marketing which further affects company goals and performance.

It is expected that artificial intelligence will affect digital marketing positively. Furthermore, marketing automation is expected to have a significant impact on digital marketing. This suggests that incorporating AI and marketing automation features into the marketing system will improve digital marketing for most companies.

Research Methodology :

This study adopts a descriptive research design, aiming to analyse and summarize existing secondary data on the impact of Artificial Intelligence (AI) in enhancing digital marketing.

A comprehensive review of academic journals, books, industry reports, and reputable online sources will be conducted to gather relevant data.

This research methodology outlines a structured approach to investigating the impact of AI in enhancing digital marketing using secondary data.

By leveraging existing literature, industry reports, and online sources, the study aims to provide a comprehensive overview of the subject, contributing to the existing body of knowledge in the field of AI-driven digital marketing.

User experience and trust:

It's crucial to look into how AI affects user experience and customer trust.

Subsequent investigations may examine the impact of AI-driven personalization and automation on consumer attitudes, involvement, and confidence in digital marketing

exchanges.

The creation of tactics that raise user happiness and foster enduring trust will be guided by an understanding of the psychological and emotional components of AI-driven marketing encounters.

AI in emerging marketing platforms:

The effects of AI on new marketing platforms like voice assistants, augmented reality (AR), virtual reality (VR), and Internet of Things (IoT) gadgets might be the subject of research.

Examining how artificial intelligence (AI) might improve consumer experiences and marketing opportunities in these developing platforms will shed light on what lies ahead for AI-powered digital marketing.

Hybrid intelligence:

Studies exploring the potential advantages to combining artificial intelligence and human interaction for digital advertising could be very beneficial. Future research can examine how combining the distinct advantages of humans and artificial intelligence can improve advertising campaigns, consumer insights, and decision-making procedures

Findings :

1. The study found that, AI-powered chatbots enhances customer interaction by providing instant responses to queries, improving user experience and engagement.
2. In the study it has been found that, AI automates routine and time-consuming tasks, freeing up marketers to focus on strategic activities.
3. The study found that, the ability to track and analyse campaign performance in real-time enables quick adjustments for better results.
4. In the study it's been found that, automated workflows, such as email campaigns, social media posting, and content creation, lead to increased efficiency and reduced operational costs.
5. The study has been found that personalized recommendations, powered by machine learning algorithms, contribute to improved customer engagement and increased conversion rates.
6. The study has also found that, AI aids in content optimization by analysing performance data and suggesting improvements to enhance engagement.

Analysis of AI Enhancement in Digital Marketing of Various Companies :

Company	AI Application	Digital Marketing Enhancement	Results
Netflix	Recommendation algorithms	Personalized movie and TV show suggestions	Increased user engagement and subscriptions
Spotify	AI-powered playlists	Customized music recommendations based on listening habits	Enhanced user experience and reduced churn
Coca-Cola	Real-time social media analytics	Sentiment analysis and targeted ad campaigns	Improved brand reputation and marketing ROI
Sephora	Virtual try-on technology	Augmented reality experience for product testing	Increased online sales and reduced product returns

Challenges and Limitations:

- Ethical Considerations: Privacy concerns and ethical dilemmas arise with AI's use in targeted advertising, as seen in the controversy around Facebook.
- Technical Challenges: The high cost and complexity of integrating AI systems into existing marketing infrastructure pose significant barriers.
- Job Displacement: The potential for AI to automate routine marketing tasks raises concerns about job displacement and the need for new skills.

Future Trends and Predictions:

- Emerging Technologies: AI-powered voice search optimization is an emerging trend that could significantly impact digital marketing.
- Market Predictions: The future landscape of AI in digital marketing is expected to see increased hyper-personalization and more sophisticated AI applications.

Conclusion :

The integration of Artificial Intelligence (AI) into digital marketing has led in a transformative era, reshaping the landscape and revolutionizing traditional practices.

The impact of AI on enhancing digital marketing is evident across various aspects of the industry, contributing to increased efficiency, personalized customer experiences, and strategic decision-making. The findings discussed in this research paper underscore the profound influence of AI on key aspects of digital marketing. AI has the potential to revolutionize digital marketing by automating various processes and enabling marketers to better understand and meet customer needs.

As digital marketers strive to enhance their strategies and engage with customers effectively, they recognize the value of AI in achieving their goals. AI's role in personalization and targeting stands out as a cornerstone of its impact. Through sophisticated algorithms, marketers can now tailor content and promotions with supreme, engaging consumers on a highly individualized level.

This not only fosters stronger connections with customers but also leads to improved conversion rates and customer loyalty. AI's incorporation into digital marketing has given companies the capacity to analyse enormous volumes of data, find hidden trends, and scale up the delivery of individualized experiences. AI systems optimize marketing initiatives based on consumer behaviours and preferences by constantly learning from and adapting to them. Even if using AI in digital marketing can increase customer engagement and give businesses a competitive edge, ethical issues and privacy concerns must be addressed to uphold customer trust and openness.

AI systems optimize marketing initiatives based on consumer behaviours and preferences by constantly learning from and adapting to them. AI's influence on digital marketing will change as it develops further. Businesses will be better positioned to satisfy customer expectations, develop meaningful engagements, and achieve long-term success in the constantly evolving digital age if they embrace artificial intelligence (AI) technologies and correctly integrate it in their marketing strategies. AI will continue to be an asset for companies seeking to maintain their competitive edge and provide outstanding digital marketing experiences—as long as it is implemented carefully, ethical issues are taken into account, and adaption is continuous.

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AI-Driven Innovations in Risk Management and Fraud Detection in Indian Banking

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Abstract : This study examines how AI-powered innovations are transforming key operations within Indian banks, specifically focusing on improvements in risk management and fraud detection capabilities.. A key component of the country's economic expansion, the Indian banking industry has experienced a significant transformation in recent years, mostly due to the deliberate incorporation of artificial intelligence (AI) into its operating framework. AI use in Indian banking signifies a fundamental shift towards data-driven decision-making and proactive risk mitigation, not just a technical advancement. Banks can now evaluate enormous amounts of data, spot intricate patterns, and produce previously unachievable actionable insights by utilizing advanced algorithms and machine learning models. Automated Fraud Detection, Credit Risk Assessment, Anti-Money Laundering (AML) Compliance, Customer Due Diligence (CDD), and Know Your Customer (KYC, expenses) are just a few of the existing AI applications in Indian banking that are methodically examined in this study. This study examines how predictive analytics manages risk and evaluates the benefits of AI implementation, including faster and more accurate fraud detection and risk assessment, and reduced operating costs through manual process automation. Speedier transaction processing and more individualized services for customers. Enhanced adherence to regulations and decreased risk of financial fines

Keywords: *AI Indian banking, Risk Management, Fraud Detection, Data-Driven Decision Making, Financial Technology etc.*

Introduction :

A key component of the country's economic development, the Indian banking industry is going through profound and rapid change. The deliberate and widespread integration of Artificial Intelligence (AI) across key operational areas is the primary driver of this progress, which is not only incremental but a fundamental reorganization. The importance of strong risk management and state-of-the-art fraud detection systems has become paramount in a

modern environment marked by the exponential growth of digital transactions, the proliferation of complex financial instruments, and the constant threat of sophisticated cybercrime. To increase operational efficiency, strengthen security procedures, and more, Indian banks are actively adopting AI-powered solutions as strategic imperatives rather than merely as technology add-ons.

This study examines in detail the exact ways that AI technologies are changing important processes in the Indian financial ecosystem. It goes beyond a cursory analysis of technology advancements to concentrate on the significant transition to proactive risk reduction and data-driven decision-making. The use of sophisticated analytical tools is required due to the large volume of data produced by modern banking operations, including transaction records, client profiles, market data, and regulatory reports. Due to AI's innate ability to process, synthesize, and interpret large and complicated datasets, banks are now able to find hidden correlations, recognize complex patterns, and derive actionable insights that were previously impossible to obtain using conventional analytical techniques.

This study will meticulously examine the current landscape of AI applications within Indian banking, with a particular emphasis on its pivotal role in:

Artificial intelligence transforms core-banking operations and reduces financial losses by automating critical procedures, particularly fraud detection. Machine-learning algorithms identify irregularities in transaction patterns and detect fraudulent activity in real-time.AI also improve credit risk assessment by analyzing a variety of data sources to produce more precise and sophisticated assessments of borrower creditworthiness. By spotting questionable transaction patterns and consumer behaviours suggestive of money laundering, it also expedites Anti-Money Laundering (AML) compliance, enhancing regulatory compliance. Lastly, AI streamlines Know Your Customer (KYC) and Customer Due Diligence (CDD) processes by automating and speeding them up, which lowers operating costs and enhances customer onboarding. Furthermore, this paper will delve into the strategic advantages that accrue from the judicious implementation of AI. These benefits extend beyond mere operational efficiencies, encompassing.

The strategic implementation of AI in banking yields significant operational and strategic advantages, including demonstrably improved speed and accuracy in risk assessment and fraud detection, resulting in quantifiable gains in detection rates and response times. Moreover, AI-driven automation directly translates to reduced operational costs by

streamlining labour-intensive processes and minimizing processing times, thus optimizing overall expenditures. Furthermore, banks leverage AI to enhance customer experiences through personalized services, offering tailored financial products, customized recommendations, and seamless digital interactions that foster customer loyalty. Finally, AI plays a crucial role in strengthening regulatory compliance by ensuring adherence to stringent requirements, thereby minimizing the risk of financial penalties and fostering a more secure and transparent financial ecosystem."

The adoption of AI is not without its difficulties, though. The inherent difficulties and potential hazards of implementing AI will also be covered in this study, such as algorithmic bias, data privacy issues, cybersecurity threats, and the requirement for qualified staff. This study intends to advance knowledge of the revolutionary potential of AI in the Indian banking industry by offering a thorough and impartial examination of the technology's effects on risk management and fraud detection. This study will investigate further how financial technology, or FinTech, in the form of artificial intelligence, is transforming the Indian economy, providing insightful information to scholars, policymakers, and industry players alike.

Objectives of the Study :

1. To analyse the impact of AI-driven innovations on risk management practices in Indian banking.
2. To evaluate the effectiveness of AI-powered fraud detection systems in identifying and preventing financial crimes.
3. To examine the role of predictive analytics in enhancing credit risk assessment and decision-making.
4. To assess how AI improves regulatory compliance, including Anti-Money Laundering (AML) and Know Your Customer (KYC) processes.
5. To explore the operational and financial benefits of AI adoption in Indian banks, including cost reduction and enhanced customer service.

Scope of the Study :

This study examines how AI-driven innovations transform risk management and fraud detection in the Indian banking sector. It focuses on AI applications such as automated fraud detection, credit risk assessment, anti-money laundering (AML) compliance, customer due diligence (CDD), and Know Your Customer (KYC) processes. The study analyzes how predictive analytics and machine learning enhance risk management strategies and improve

decision-making. This research covers commercial and private banks in India and assesses their AI adoption, challenges, and benefits. It investigates how AI-powered automation reduces operational costs, accelerates transactions, and enhances customer service. By focusing on data-driven insights, this study provides a structured analysis of AI's role in reshaping the Indian banking industry.

Significance of the Study :

This study helps banking institutions, policymakers, and financial technology professionals understand how AI-driven innovations enhance banking operations. It demonstrates the growing importance of proactive risk management and real-time fraud detection, allowing banks to minimize financial losses and comply with regulatory requirements more effectively.

By identifying best practices, the study enables banks to leverage AI for greater efficiency, accuracy, and cost reduction. It also benefits customers by improving security, reducing fraud risks, and personalizing banking services. Additionally, this study contributes to academic and business literature by offering data-driven insights into AI's future in banking.

Literature Review:

Layla Abdel-Rahman Aziz & Yuli Andriansyah (2023) showed that with the introduction of cutting-edge technologies, risk management and banking fraud prevention are developing quickly. Artificial Intelligence (AI) is a major technological force in these fields. Humans are unable to manually sort through and identify anomalies due to the continually increasing volume of data. This is where artificial intelligence (AI) comes in, allowing fraud detection and prevention strategies to go from reactive to proactive. AI provides predictive insights and enables immediate action in questionable situations by leveraging the massive amounts of data produced by banks. Static, rule-based techniques were the mainstay of traditional financial systems' fraud detection strategies. These approaches frequently lagged, allowing little to no opportunity for real-time response and only identifying anomalies after they happened.

Fatema Tuz Johora et al (2024) this research highlights the crucial role of artificial intelligence in detecting fraudulent banking transactions. We propose and test several classification algorithms, each designed to identify various types of fraudulent activity based on different criteria. Our artificial neural network-based methodology significantly enhances the accuracy of fraud detection. Furthermore, Researchers explore techniques like feature engineering, feature transformation, and methods for balancing datasets to further improve

detection accuracy. Our research demonstrates the powerful ability of AI algorithms to identify banking fraud. After rigorous training and testing, every algorithm performed exceptionally well, achieving an Area under the Curve (AUC) value exceeding 0.9. The consistent Receiver Operating Characteristic (ROC) curves, showing minimal variation, reinforce this strong performance. Notably, our analysis revealed that all algorithms effectively detect fraudulent bank transactions. However, logistic regression quantitatively outperformed the others, achieving an AUC value of approximately 0.946.

These results conclusively demonstrate the effectiveness of artificial intelligence in combating banking fraud, with logistic regression proving to be particularly successful.

Mani Prabha (2024) examines the revolutionary role data analytics and machine learning play in thwarting banking fraud. These technologies dramatically improve the detection and prevention of fraudulent activities by leveraging their ability to process and analyze massive volumes of data in real time. However, financial institutions must address several key challenges to successfully implement these technologies.

Specifically, they must:

- Ensure data availability and maintain high data quality.
- Improve the interpretability of machine learning models.
- Integrate machine-learning systems with existing infrastructure.
- Comply with legal and ethical regulations.

To maximize the effectiveness of data analytics and machine learning in fraud prevention, financial institutions must:

- Modernize their IT infrastructure.
- Adopt transparent and explainable models.
- Invest in robust data management practices.
- Implement stringent data governance frameworks**.**

Varun Jain (2024). The literature review reveals the complexity of integrating AI into financial industry compliance. Researchers have identified key challenges and proposed potential solutions.

Specifically, they:

- Underscore the need to address data protection and ethical considerations.
- Point out the difficulties of technical integration of AI systems.
- Emphasize the critical role of human oversight.

In order to leverage AI's potential responsibly, financial organizations must: Implement robust data governance frameworks.

- Establish ethical AI practices.
- Ensure AI operations are transparent and understandable.
- Guarantee ongoing training and adaptation.

This comprehensive strategy not only ensures compliance with legal requirements but also cultivates stakeholder trust, thereby strengthening, rather than compromising, the security and integrity of financial systems through the ethical application of **AI.**

Rithin Gopal Goriparthi(2023) This study demonstrates how AI-driven data mining effectively detects financial fraud in large-scale systems. We conduct a comparative study of machine learning models—DNN, Random Forest, SVM, and Logistic Regression—and assess key metrics including TPR, FPR, Precision, Recall, F1-score, and AUC-ROC. While DNNs deliver superior prediction performance, they present challenges regarding interpretability and processing requirements. Our threshold sensitivity analysis reveals the trade-offs involved in balancing the need to minimize false alarms against the imperative to accurately identify fraud.

The study underscores the necessity of a comprehensive strategy that balances speed, scalability, and accuracy. We recommend hybrid models and anomaly detection as future research directions to enhance fraud detection and strengthen financial security.

Tolulope Esther Edunjobi and Opeyemi Abayomi Odejide(2024)found that Through applications like credit scoring, fraud detection, and portfolio management, artificial intelligence (AI) is transforming credit risk assessment by improving accuracy, efficiency, and decision-making. Nonetheless, issues including model transparency, data quality, ethical considerations, and regulatory compliance need to be resolved. Among the solutions are quantum computing for sophisticated modelling, federated learning for safe collaboration,

and Explainable AI (XAI) for improved interpretability. Best practices and ethical standards are essential for the proper use of AI. By overcoming obstacles, financial institutions can improve risk management, expedite assessments, and streamline procedures—all of which will contribute to the development of a stable and sustainable financial ecosystem through human-AI cooperation.

Umara Noreen (2023) showed that from conventional banking (1472) to AI-based banking (2017 forward), the banking industry has seen tremendous change in core banking, operations, and customer service. This study investigates consumer intentions on AI adoption in banking as well as the difficulties associated with integrating AI. It investigates the predictors (AWR, ATT, SN, PR, PU, and KNG) affecting AI adoption using a quantitative research methodology. The findings indicate that every predictor has a favorable effect on AI adoption, with the exception of PR, which has a negative effect. Based on data gathered from five Asian countries (Pakistan, China, Iran, Saudi Arabia, and Thailand), adoption trends differ by nation and educational attainment. With a focus on AI-driven personalized suggestions and financial management tools, the study offers insights for banking strategy.

Background of Credit Risk Assessment :

A key component of financial organizations' risk management plans is credit risk assessment, which guarantees loan repayment capacity and general stability. It has historically depended on professional opinion, statistical models, and historical financial data. These approaches, however, had drawbacks, including a tendency toward bias, difficulty handling complicated borrower profiles, and an inability to reflect market dynamics. AI has become a disruptive force as financial landscapes change, providing increasingly complex methods to improve the precision and effectiveness of credit risk assessment. Institutions may overcome conventional obstacles and make better lending decisions by utilizing AI, which will help to stabilize the financial system.

Emergence of AI in Finance :

Artificial intelligence (AI) is transforming the financial industry by improving risk management, enhancing investment decisions, and enriching consumer experiences through sophisticated data analysis and predictive modeling.

- Machine learning and deep learning enable AI to evaluate large datasets, integrating information from utility payments, social media activity, and online browsing history for a more comprehensive credit assessment.

- AI enhances prediction accuracy, automates decision-making, and streamlines processes, allowing human experts to focus on strategic tasks.
- However, organizations must address issues such as bias, lack of transparency, and regulatory concerns to ensure ethical AI implementation.
- Properly managing AI can create a more stable, efficient, and data-driven financial system.

Significance of AI in Credit Risk Assessment :

AI is revolutionizing credit risk assessment by leveraging advanced analytics, machine learning, and alternative data sources to create a more comprehensive borrower profile. Unlike traditional methods that rely on historical financial data, AI incorporates real-time insights from sources like social media, web browsing behavior, and employment changes, allowing for more accurate and dynamic risk evaluation. AI enhances predictive capabilities by identifying subtle indicators of default through machine learning and deep learning techniques, reducing loan defaults and fostering a stable financial system. Additionally, AI automates credit scoring and data analysis, expediting loan processing while allowing human experts to focus on complex cases. While AI streamlines decision-making, financial institutions must balance automation with human judgment to ensure fair, transparent, and inclusive lending practices.

Theoretical Frameworks in AI for Credit Risk Assessment :

AI-driven credit risk assessment employs several machine-learning techniques to boost prediction efficiency and accuracy. Specifically:

- Support Vector Machines (SVMs) actively separate defaulting borrowers from non-defaulting ones.
- Decision trees actively categorize borrowers based on their risk profiles.
- Semi-supervised learning actively merges labeled and unlabeled data to refine predictions.
- Unsupervised learning, such as K-Means Clustering, actively groups borrowers with similar traits.
- Expectation-maximization (EM) actively refines models through iterative processes.

These strategies enhance decision-making, accelerate loan approvals, and uncover complex

patterns that traditional methods overlook. However, challenges persist, including data quality, model interpretability, and regulatory compliance. Therefore, banks must carefully implement these techniques to ensure fairness, transparency, and ethical AI application.

Challenges and Opportunities in Utilizing AI for Credit Risk Assessment :

To assess credit risk effectively, organizations must ensure transparency, security, regulatory compliance, and high-quality data.

- Developers must rigorously verify data and reduce bias to prevent the creation of biased models.
- Explainable AI (XAI) enhances transparency and strengthens trust in predictions.
- Organizations must uphold legal and ethical standards to prevent discrimination.
- Teams must continuously monitor and update AI models to defend against adversarial attacks.
- IT teams must collaborate and upgrade infrastructure to integrate AI with legacy systems.
- Companies must train staff and establish academic partnerships to overcome the AI expertise shortage, fostering ethical and efficient credit risk assessment for long-term success.

Implications of AI for Banking Efficiency and Accuracy :

AI integration in credit risk assessment enhances banking efficiency and accuracy by automating tasks like data analysis, scoring, and application filtering. This reduces processing time, allowing loan officers to focus on complex cases. AI-driven risk assessment improves borrower evaluations, leading to informed lending decisions and reduced defaults. Faster processing and AI chatbots enhance customer experience, while automation lowers operational costs. AI also aids regulatory compliance by detecting fraudulent transactions. However, responsible implementation is crucial—banks must mitigate bias, ensure transparency through explainable AI (XAI), and maintain human oversight for fair and ethical decision-making.

Research Methodology :

Researchers in this study used a qualitative and quantitative approach to analyze AI-driven innovations in risk management and fraud detection in Indian banking. They collected primary data by interviewing banking professionals and AI experts, and gathered secondary data from academic journals, industry reports, and case studies. Finally, they examined

machine learning models and AI-based fraud detection tools to assess their risk mitigation effectiveness.

The research framework involves:

1. Identifying key AI applications in Indian banking.
2. Analysing their impact on fraud detection and risk management.
3. Evaluating regulatory compliance improvements due to AI adoption.
4. Assessing the cost-benefit analysis of AI integration.

Findings and Discussion:

The study's findings highlight the significant advantages of AI-driven innovations in risk management and fraud detection. AI-powered fraud detection systems have reduced fraudulent transactions by identifying suspicious activities in real time. Predictive analytics tools help in assessing credit risks more effectively, leading to better lending decisions and lower non-performing assets (NPAs).

Furthermore, AI applications in AML and KYC compliance have streamlined verification processes, ensuring enhanced security and regulatory adherence. The automation of risk management tasks has also led to operational cost reductions, allowing banks to allocate resources more efficiently.

However, challenges such as data privacy concerns, the need for continuous algorithm updates, and the risk of AI bias require attention. Financial institutions must implement robust data governance policies and ensure transparency in AI-driven decision-making processes.

Conclusion:

Artificial intelligence (AI) has fundamentally reshaped risk management and fraud detection within the Indian banking sector, ushering in an era of heightened efficiency, unparalleled accuracy, and streamlined regulatory compliance. Financial institutions are increasingly leveraging sophisticated AI-driven solutions to meticulously analyze vast and complex datasets, enabling them to swiftly identify subtle anomalies and proactively mitigate potential risks before they escalate. These solutions utilize advanced algorithms to discern patterns

indicative of fraudulent activity, thereby preventing substantial financial losses and safeguarding customer trust.

Despite AI's transformative potential, challenges persist, including robust data governance, mitigating algorithmic bias, and adapting to evolving cyber threats. However, ongoing advancements in AI technology, alongside supportive regulations and collaborative industry initiatives, are set to strengthen the banking sector's resilience against sophisticated financial crimes. This proactive approach will enhance the stability and security of India's financial ecosystem.

Looking ahead, future research can delve into the long-term, multifaceted impact of AI on banking security, exploring its evolving role in safeguarding sensitive financial data and mitigating emerging cyber threats. Furthermore, the synergistic potential of block chain technology in complementing AI-driven fraud detection warrants in-depth investigation. Research should examine how block chain's inherent transparency and immutability can enhance the verification and authentication processes, bolstering the effectiveness of AI-powered security measures. Crucially, the ethical implications of AI adoption in financial decision-making must be thoroughly addressed. Researchers should explore the potential for algorithmic bias, the importance of transparency in AI-driven decisions, and the need for robust ethical guidelines to ensure equitable and responsible deployment.

By embracing AI innovations responsibly, with a focus on ethical considerations and robust security measures, Indian banks can cultivate a secure, transparent, and customer-centric financial ecosystem. This approach will not only enhance operational efficiency and mitigate financial risks but also foster trust and confidence among customers, reinforcing the stability and integrity of the Indian banking sector in the digital age

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The Role of Social Media Marketing in Hospital Branding and Patient Awareness

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Abstract : Social media has revolutionized the way hospitals engage with patients, transforming healthcare marketing into a more interactive and accessible process. Platforms such as Facebook, Instagram, Twitter, LinkedIn, and YouTube enable hospitals to disseminate health information, promote services, and establish stronger connections with patients. Unlike traditional marketing, social media fosters real-time communication, allowing healthcare providers to engage with their audience, address concerns, and build trust (Radu et al., 2022). By leveraging educational content, patient testimonials, and expert-led discussions, hospitals enhance their credibility and encourage informed healthcare decisions (Alotaibi et al., 2021).

Despite its advantages, social media marketing in healthcare presents challenges such as misinformation, ethical concerns, data privacy issues, and compliance with regulatory frameworks (Hao & Gao, 2022). Hospitals must adopt strategic approaches to navigate these challenges while ensuring transparency and ethical integrity. This study explores the role of social media marketing in hospital branding and patient awareness, identifying effective engagement strategies and analyzing their impact on healthcare decision-making. Through a comprehensive review of existing literature and case studies, the research provides insights into best practices for hospitals to optimize their digital presence while maintaining patient trust and regulatory compliance.

Keywords: *Social media marketing, healthcare branding, patient awareness, digital communication.*

Introduction :

The rise of social media has transformed how hospitals communicate with patients, making healthcare information more accessible and interactive. Unlike traditional marketing, social media enables real-time engagement, allowing hospitals to educate, inform, and build trust with their audience (Chen et al., 2021). Patients increasingly rely on digital platforms to seek

medical advice, read reviews, and understand treatment options, influencing their healthcare decisions (Wong et al., 2022). Hospitals use platforms like Facebook, Instagram, LinkedIn, and YouTube to share expert opinions, success stories, and educational content, strengthening their credibility (Zhang & Goggins, 2021). However, while social media offers significant benefits in branding and patient awareness, challenges such as misinformation, data privacy concerns, and ethical considerations remain (Jin & Muqattash, 2023). This study explores how hospitals leverage social media for marketing, its impact on patient awareness, and the challenges they must navigate in the digital landscape.

Literature Review:

Social media has revolutionized healthcare marketing by enabling hospitals to connect with patients, share medical insights, and enhance brand credibility. Research suggests that hospitals leveraging platforms like Facebook, Instagram, and YouTube for educational content, patient testimonials, and expert-led discussions experience higher patient engagement and trust (Alotaibi et al., 2021). Content marketing strategies, such as video explanations of medical procedures and interactive Q&A sessions, have proven effective in educating patients and influencing healthcare decisions (Chen et al., 2021). Additionally, collaborations with healthcare professionals and patient advocates enhance authenticity, making hospitals more approachable and reliable sources of medical information (Wong et al., 2022).

Despite its benefits, social media marketing in healthcare presents significant challenges. The spread of misinformation, ethical concerns regarding patient confidentiality, and compliance with healthcare regulations remain major obstacles (Hao & Gao, 2022). Studies highlight the need for hospitals to establish guidelines for responsible digital marketing, ensuring transparency and accuracy in medical content. Moreover, the evolving nature of digital platforms necessitates continuous adaptation of marketing strategies to maintain audience engagement and trust. While existing literature underscores the effectiveness of social media in hospital branding and patient awareness, further research is needed to assess its long-term impact on patient behavior, treatment decisions, and institutional reputation.

Research Methodology:

This study employs a secondary research methodology, analyzing existing literature, case studies, industry reports, and digital analytics to examine the role of social media in healthcare marketing. By evaluating current trends and hospital marketing strategies, the research identifies key patterns, benefits, and challenges associated with social media marketing in the healthcare industry.

Research Questions:

1. How do hospitals utilize social media marketing to enhance patient awareness and engagement?
2. What types of social media content are most effective in building patient trust and influencing healthcare decisions?
3. How does social media marketing impact hospital branding and the patient selection process for healthcare providers?

Research Gap:

Despite the growing use of social media in healthcare marketing, there is limited research on its direct impact on hospital branding and patient awareness. While existing studies explore digital marketing in healthcare, few focus specifically on how hospitals leverage platforms like Facebook, Instagram, and YouTube to build trust and influence patient decisions. Additionally, most research examines general healthcare communication rather than targeted branding strategies, influencer collaborations, or the ethical challenges hospitals face in maintaining transparency and compliance. This study aims to bridge these gaps by analyzing the effectiveness of social media marketing in strengthening hospital reputation, improving patient engagement, and addressing key challenges such as misinformation and data privacy.

Research Objectives:

This study aims to explore the role of social media marketing in hospital branding and patient awareness. The key objectives are:

1. To examine how hospitals use social media for patient education and engagement.
2. To assess the impact of social media marketing on patient trust and healthcare choices.
3. To evaluate the effectiveness of strategies like influencer collaborations, live Q&As, and targeted ads in hospital branding.
4. To identify challenges such as misinformation, privacy concerns, and regulatory issues, and suggest ethical marketing solutions.

The Role of Social Media n Hospital Branding:

Branding in healthcare extends beyond logos and promotional campaigns; it revolves around trust, reputation, and patient experience. Social media enables hospitals to establish themselves as credible sources of medical information while strengthening their relationship

with the public. Key branding strategies include:

- **Educational Content:** Hospitals publish blogs, infographics, videos, and social media posts to educate patients and position themselves as industry leaders (Chen et al., 2021).
- **Influencer & Expert Collaborations:** Partnering with doctors, healthcare influencers, and patient advocates enhances credibility and broadens audience reach (Hao & Gao, 2022).
- **Community Engagement Initiatives:** Hosting live sessions, webinars, and interactive health campaigns fosters stronger connections with patients (Wong et al., 2022).

Enhancing Patient Awareness through Social Media :

Hospitals utilize social media to distribute accurate and accessible health information, increase awareness about medical conditions, and promote preventive care. Common strategies include:

- Sharing educational content on disease prevention, treatment options, and healthy lifestyle tips.
- Providing updates on new medical procedures, such as robotic surgeries and advanced diagnostics.
- Conducting public health awareness campaigns on topics like vaccinations, seasonal illnesses, and mental health.

For example, during the COVID-19 pandemic, hospitals relied heavily on social media to share real-time updates, vaccination drives, and safety protocols. This not only helped combat misinformation but also strengthened public trust in healthcare institutions (Alotaibi et al., 2021).

Challenges and Ethical Considerations:

Despite its numerous benefits, social media marketing in healthcare presents various challenges:

- **Misinformation and Fake News:** Unverified health information can mislead patients and harm hospital credibility (Zhang & Goggins, 2021).
- **Data Privacy and Compliance:** Hospitals must adhere to strict patient confidentiality laws such as HIPAA (in the U.S.) and GDPR (in Europe) (Alsuraihi et al., 2020).

- **Reputation Management:** Negative reviews, online criticism, or misinformation can impact public perception. Effective crisis management strategies are crucial (Radu et al., 2022)

Conclusion:

Social media marketing has become an essential part of modern healthcare communication, offering hospitals a platform to enhance patient awareness, build credibility, and establish lasting relationships. Digital platforms enable healthcare providers to engage audiences through educational content, expert-led discussions, and interactive campaigns, all of which contribute to better-informed patients.

However, hospitals must approach social media marketing with caution, ensuring ethical integrity, transparency, and compliance with healthcare regulations. While social media serves as a powerful tool for branding and patient education, hospitals must proactively address misinformation, privacy concerns, and negative feedback to safeguard their reputation. The future of healthcare marketing hinges on patient-focused, responsible digital engagement strategies that foster trust and encourage informed decision-making.

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The Dilution of Business Acumen: How Repeating Undergraduate Activities in B-Schools Undermines Managerial Growth

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Abstract : This research paper aims to explore how the effectiveness of business education is limited and managerial development is hindered due to B-schools' lack of diverse learning strategies. This study highlights significant flaws in the current system and makes the case for a rethink of B-school activities by examining event formats, student participation levels, and industry expectations. To guarantee that postgraduate business education promotes strategic thinking, creativity, and entrepreneurial skills, the findings highlight the necessity of experiential learning models, leadership boot camps, corporate mentorship programs, and venture incubation activities.

B-schools should expose students to real-world business difficulties, case-based learning, and practical industry exposure, in contrast to undergraduate programs that mostly concentrate on theoretical learning and foundational knowledge.

Nevertheless, many B-schools frequently repeat the same events, activities, and engagement methods without clearly differentiating between undergraduate and graduate learning experiences. Because students miss the chance to hone their critical thinking, problem solving, and leadership abilities, this repetition jeopardizes the development of vital business acumen. Some universities still rely on generic academic debates, cultural festivals, and non-industry-focused competitions in place of high-impact corporate collaborations, live case studies, and investment simulations. These methods do not adequately prepare students for the intricate realities of international business.

Keywords: *B- Schools, Business Acumen, Experiential Learning, Extracurricular Activities, Events/Fest.*

Introduction:

Background: This research highlights the challenge of merging undergraduate and graduate education without adequately distinguishing the differences in academic standards, expectations, and course structures. The main argument posits that individuals entering graduate programs often maintain a 'graduation mode,' a term that refers to the learning habits

and objectives shaped by their undergraduate experiences

Key Issues Identified:

1. **Lack of Course Structure Differentiation**: Undergraduate education is usually more structured, led, and broad-based, whereas postgraduate education requires a more in-depth, analytical, and research-oriented approach. Nevertheless, many B-schools do not have a clear academic structure, so students think graduate school is just an extension of their undergraduate education.
2. **Continued Undergraduate-Level Activities:**

    - The table supplied enumerates several Extracurricular and social events, including Bollywood Day, Chocolate Day, and Black & White Day.
    - Some events, like AI Apps Day and Business Quiz Day, are simply for fun, others are important for professional growth.
    - Postgraduate students' employability may be declining as a result of their ineffective trans
    - Short-Term Engagement vs. Long-Term Employability:

To keep students interested and satisfied, B-schools frequently promote familiar activities from their undergraduate years. Nevertheless, this method might divert attention from professional skill development, career preparation, and industry-oriented learning. The outcome is a skill gap that causes postgraduate students to become more unemployed. To help students develop practical business acumen, critical decision-making skills, and strong leadership traits, educators felt that MBA programs should emphasize extracurricular activities in addition to typical classroom-based theoretical study. While theoretical knowledge provides a foundation, experiential learning is what prepares students for complex problem-solving, high-pressure decision-making and dynamic business environments. Modern companies increasingly seek professionals who can think strategically, analyze real-time data, adapt to market changes, and lead teams effectively. To meet these needs, MBA programs should integrate engaging and immersive learning experiences that replicate business challenges, foster innovation, and cultivate managerial and entrepreneurial skills. By collaborating with industry partners, offering leadership development workshops, establishing start-up incubators, conducting simulations, and facilitating live consulting projects, students can connect theoretical knowledge with real-world business issues. These

activities not only enhance abilities in strategic thinking and financial decision-making but also strengthen skills in negotiation, crisis management, and understanding global business dynamics—all critical for thriving in today's fast-evolving corporate landscape. The upcoming sections will outline essential experiential learning opportunities that enable MBA students to sharpen their analytical capabilities, evaluate risks, and develop leadership qualities, ensuring they graduate as proficient, industry-prepared professionals ready to drive business success in competitive markets.

Research Problem:

This study examines if the repetition of undergraduate-level activities in business schools diminishes business acumen and hinders the development of managerial skills..

Objectives of study :

- To examine how undergraduate and graduate business education differs in terms of learning outcomes.
- To investigate how repetitious tasks affect business acumen
- To suggest creative event design that foster managerial development.

Table 1. - General List of activities :

Black & White Day	Mismatch Day:	Horror Day	Business Quiz Day
Chocolate Day	MS Office Day	Halloween	Book Review Day
Mismatch Day:	Fish Pond	Cleaning Day	Human Rights Day
Traditional/Saree/Tie Day:	Shero Shayri	Rangoli Day	Constitution Day
Rose Day	Music	Decoration Day	Sanvidhan Day
Twins Day	Fitness ka dose	CSR Activity	AI apps Day
Bollywood Day	Sports Day	Yoga Day	Budget Day

Curricular Activities (Directly Related to Learning & Employability)

1. **Business Quiz Day** – Enhances industry knowledge and business acumen.
2. **Book Review Day** – Encourages reading and critical thinking skills.
3. **Human Rights Day** – Promotes awareness of global and ethical issues.
4. **Constitution Day (Sanvidhan Day)** – Educates students on governance and legal frameworks.
5. **CSR Activity** – Aids in comprehending corporate social responsibility, ethical practices, and the impact of business.
6. **AI Apps Day** – Develops awareness of AI and technological advancements.

7. **Budget Day** – Enhances financial literacy and understanding of economic policies.
8. **MS Office Day** – Improves practical skills in essential workplace tools.

Extracurricular Activities (Primarily for Engagement, Fun & Social Interaction)

1. **Black & White Day** – Themed dress-up day.
2. **Horror Day** – Entertainment-based activity.
3. **Chocolate Day** – Celebration-focused event.
4. **Mismatch Day** – Fun dress-up event.
5. **Cleaning Day** – A social or community-driven activity.
6. **Traditional/Saree/Tie Day** – Cultural celebration.
7. **Shero Shayari** – Poetry and creative expression.
8. **Rangoli Day** – Art and culture-based activity.
9. **Dish Day** – Food and culinary enjoyment.
10. **Decoration Day** – Creative event.
11. **Twins Day** – Fun social activity.
12. **Bollywood Day** – Entertainment-based activity.
13. **Rose Day** – Social and relationship-building event.
14. **Fish Pond** – Fun engagement activity.
15. **Music** – Artistic and recreational.
16. **Yoga Day** – Wellness and health-focused.
17. **Sports Day** – Physical fitness and teamwork.
18. **Fitness Ka Dose Addha Ghanta Rose** – The program encourages fitness but is not directly related to academics
19. **Curricular activities** contribute to skill development, knowledge enhancement, and employability.
20. **Extracurricular activities** focus on social engagement, creativity, and recreation.

B-schools should balance both but prioritize curricular activities to enhance career readiness and employability.

Literature Review:

Jarosiński (2014) suggested that Education's primary function has always been to prepare students for adulthood. Higher business education aims to prepare students for today's highly demanding corporate and professional world. To better prepare them Business schools seek innovative approaches to instruction to prepare graduates for the real world of business. One

such approach is experiential learning.

Robert D. Green & Farideh A. Farazmand (2012) demonstrated the academic benefit of internships by showing that previous internships do enhance learning outcomes for live-case course assignments. The findings also support Walker et al. (2001), which found that including several experiential learning projects and an internship in various courses within the four-year business school curriculum has a greater impact on student learning. Particular results showed that students with previous internships performed better academically than those without and that students' "buy-in" to the projects was significant whether they had previously interned. International and female students, for example, benefited more than other pupils did. Their previous internship experience greatly influenced the success of the female-led projects

Lora Reed et al (2018) Found that both undergraduate and graduate students can benefit from the utilization of virtual service learning, case studies, simulations, organizational consultancy, scholarly research, and virtual internships. Major certifying organizations like the AACSB encourage this kind of curriculum design. This is fantastic news because it does not seem like the historically high rates of change in higher education and industry will slow down anytime soon. It seems that as a field of study in and of itself, strategic partnerships and alliances among these education stakeholders will only grow. As a result, this story is probably "to be continued."

Anju Kumar (2019) examined how theatre can serve various purposes in educational and organizational processes, such as uniting people, establishing forums for group reflection and action, encouraging participation and the expression of common concerns, fostering confidence and identity, promoting critical thinking, and inspiring people to take action. Experts sum up experiential learning as the process of learning from experience

P. S. Aithal 1 & Nandita Mishra (2024) stated that the complex field of experiential learning in higher education achieves its stated goals through a thorough investigation of its forms, tenets, and effects on students. Researchers have clarified experiential learning's conceptual underpinnings, highlighting its role in bridging the theory-practice divide. From collaborative projects to immersive simulations, the identification and assessment of diverse experiential learning models demonstrate the range of techniques and the cross-disciplinary flexibility of this educational approach. There are significant ramifications for institutes of higher learning. It becomes clear when we examine the effects of adopting experiential learning that faculty development and curricular integration are essential to creating an innovative culture.

Daniel Nation et al (2014) showed that providing educationally effective real-life experiential learning opportunities is particularly difficult, especially when students choose an online learning environment to accommodate the demands of higher education within their busy, often overloaded adult lives. Developing and implementing high-quality experiential learning experiences can be time-intensive, hard to assess, difficult to scale appropriately for both the learner and the opportunity, and costly. This challenge becomes even more complex as the institution or student population expands. In many educational settings, simulations of experiential learning may offer a more feasible solution (Beckem & Watkins, 2012)

Randa El Bedawy (2017) Researchers have noted that educators primarily concentrate on ensuring effective learning for students. This study highlights the significance of adopting an experiential learning approach to improve learning effectiveness in business education. The case study demonstrates how various student teams responded positively to the business simulation as a new experiential learning method, confirming its effectiveness as a valuable teaching tool in business education. In light of the competitive market, experiential learning can enhance the reputation of business education institutions by equipping students with advanced technical and interpersonal skills, making them more attractive to employers.

Bushe Lekang et al (2017) revealed that According to the results, respondents believed that technical elements had affected the program's usefulness, whilst teachers alone believed that administrative variables had an impact. Student and teachers' perceptions of the factors affecting the experiential learning program's usefulness regarding discipline showed significant disparities, whereas researchers found no significant discrepancies Students perceived that teachers frequently used most teaching methods, whereas teachers believed they applied them infrequently. Researchers observed that students and teachers assessed the effectiveness of each teaching strategy differently, except for the project method. Both groups agreed that they rarely utilized extracurricular activities; although students evaluated the use of specific extracurricular activities differently. Institutions do not provide adequate support for graduates who choose self-employment. Beyond extracurricular activities, institutions should take steps to improve their overall characteristics

The Pitfalls of Repetitive Activities in B-Schools :

Because it encourages a superficial understanding of business concepts rather than cultivating the critical thinking and strategic decision-making skills required in fast-paced corporate settings, repeating undergraduate coursework in business schools significantly impairs managerial competency and dilutes business acumen. Cultural festivals, traditional classroom lectures, and broad academic debates all promote social connection, but they fall short in

preparing students for the complexities of real-world business challenges. Therefore, business education must go beyond existing approaches.

B-schools must implement industry-focused, experiential learning strategies that prioritize practical experience, creativity, and problem-solving in order to close this gap. This can be accomplished by exposing students to intricate business problems through organized, real-world case competitions, where they must use their strategic vision, critical thinking abilities, and inventiveness to offer workable answers. If venture incubation programs were incorporated into the curriculum, students would have the opportunity to create, test, and refine business ideas in a nurturing setting with the assistance of seasoned entrepreneurs and industry professionals. .

Initiatives for leadership networking that allow students to speak with business executives, seasoned professionals, and possible investors directly should be prioritized. These exchanges promote the development of professional networks, ease the exchange of knowledge, and offer insightful information about market trends and executive decision-making. AI-powered business simulations are also essential to contemporary business education. These simulations improve students' ability to navigate complex business scenarios and make data-driven decisions by giving them a safe and controlled environment in which to experience the outcomes of strategic decisions. Artificial intelligence can be used by B-schools to develop individualized learning programs that adjust to the strengths and weaknesses of each student, making the learning process more engaging and successful. Business schools can guarantee that their graduates are professionals who are well-rounded and prepared for the workforce.

The Pitfalls of Repetitive Activities in B-Schools:

Future executives, entrepreneurs, and leaders are supposed to grow up at business schools. However, a lot of B-schools still adhere to a structure similar to that of undergraduate institutions, mostly depending on monotonous exercises that don't really help students become ready for the real world of business. Cultural festivals, scholarly discussions, and social events all contribute to a well-rounded student experience, but when they are overemphasized, they take the place of opportunities for experiential, industry-relevant

Similarities between Undergraduate and B-School Events

1. Cultural Fests, Academic Debates, and Social Events Dominate Both Levels :

Large-scale cultural events, talent shows, and intercollegiate competitions—activities that are typically observed at the undergraduate level—remain a top priority for many B-schools.

These gatherings facilitate networking and team building, but they have little effect on the growth of management, strategic, or entrepreneurial skills. Such events frequently draw a lot of time, money, and student attention away from learning opportunities that are focused on the industry.

In a similar vein, panel discussions and scholarly arguments, while intellectually engaging, frequently lack real-world business implications.

2. Lack of High-Stakes Business Decision-Making Experiences :

Undergraduate education places a strong focus on foundational learning, where students learn theoretical concepts without having to worry about how they will be used in the real world. Unfortunately, many B-schools mimic this approach without providing students with practical decision-making experiences that mirror the intricacy of corporate leadership. The capacity to make important decisions is a critical component of management competency. Business graduates ought to be put in scenarios that require them to assess risks, allocate resources, manage crises, and make well-informed business decisions under erratic conditions.

3. Overemphasis on Theoretical Knowledge Rather Than Applied Learning:

The over-reliance on theoretical frameworks rather than practical business application is one of the most serious drawbacks of repetitious activities in B-schools. Traditional lectures, written assignments, and class discussions still make up a large portion of many MBA programs, which fail to sufficiently include experiential learning techniques. Understanding business models, market theories, and economic principles is only one aspect of business education; students should also be able to use this information in practical situations. Working closely with startups, advising for well-established companies, managing investment portfolios, and taking part in AI-driven business simulations that assess students' skills in changing market conditions are all examples of applied learning activities.

The Impact on Business Acumen :

In business schools, repetitive, undergraduate-style activities seriously impede the development of critical business acumen. Students should be prepared for the intricacies of leadership positions, entrepreneurial endeavors, and corporate decision-making through business education. However, graduates are ill-prepared to handle the constantly changing market scenario due to the lack of structured leadership exercises, dynamic business simulations, real-world corporate exposure, and industry networking opportunities.

1. Limited Exposure to Real-World Corporate Challenges :

One of the biggest drawbacks of standard B-school activities is the lack of direct exposure to

real-world business challenges. Many students struggle to put their theoretical knowledge into practice in busy, high-pressure situations, even after graduating. In the business world, managers and leaders are expected to handle market disruptions, economic volatility, competitive challenges, and technological advancements. If students are not exposed to real-world business cases, market volatility, and real-time strategy creation, they miss out on the opportunity to develop resilience and adaptability—two traits that are critical for success in the contemporary global economy. To bridge this gap, B-schools can implement experiential learning programs such as live startup partnerships, industry consulting engagements, and corporate immersion experiences. By working with companies to solve actual business problems, students can acquire practical knowledge that goes beyond the theoretical ideas covered in textbook

2. Failure to Develop Leadership Skills through Structured Decision-Making Exercises :

Leadership must be developed through organized decision-making exercises that replicate actual business situations; it cannot be taught just through lectures. Sadly, a lot of business schools overlook this important factor, which leaves graduates with little expertise in leadership.

Business executives in the real world have to make crucial choices about competitive positioning, organizational reorganization, financial investments, and crisis management. Without organized activities like crisis management drills, high-pressure decision-making trials, and executive boardroom simulations, students lack the expertise and confidence needed to lead successfully.

B-schools should integrate leadership development programs that include:

- Business war games are competitive strategy drills that mimic conflicts in the sector.
- Boardroom simulations, in which students assume executive positions and make important business choices.
- Case studies on crisis management: addressing actual business situations to hone problem-solving abilities.

Through these exercises, students gain the critical abilities required for leadership positions in any organization: the ability to evaluate difficult circumstances, make data-driven judgments, and accept accountability for results.

3. Reduced Problem-Solving Abilities Due to the Absence of Dynamic Business Simulations :

Problem-solving skills are crucial for business success. However, many business schools continue to use static, outdated case studies in place of dynamic, AI-driven business simulations that evaluate students' analytical and strategic thinking skills in real time. Traditional case studies, while instructive, focus on past business problems with known solutions. On the other hand, AI-powered simulations place students in dynamic market settings where they have to react to shifting consumer preferences, changes in the economy, and competition. For example, business simulation programs can place students in the role of CEOs, putting them in charge of managing supply chain disruptions, launching new products, and making strategic investment decisions. These interactive experiences provide more insights into financial management, operational effectiveness, and marketing strategies than do strictly theoretical courses. B-schools can guarantee that graduates acquire the critical thinking, problem-solving, and adaptability skills necessary in today's rapidly changing business environment by incorporating these simulations into the curriculum.

Lack of Networking Opportunities with Industry Leaders and Venture Capitalists :

Networking is one of the best aspects of attending business school, but many institutions don't provide their students with structured opportunities to interact with venture capitalists, prosperous entrepreneurs, and industry experts. Instead, networking opportunities are usually limited to professional fairs or informal get-togethers where little to no interaction occurs. If business students want to start their own companies or get senior positions, they must have access to a strong professional network.

To enhance networking, B-schools should implement:

- Senior business executives are paired with students through executive mentorship programs.
- Student presentations of company concepts to actual investors are known as investment pitch events.
- Exclusive leadership conferences, where students interact with influential politicians and business leaders.
- Alumni-driven incubators: these are websites that pair students with accomplished alumni who can provide capital or business advice.

B-schools can guarantee that graduates depart with more than just academic knowledge but also useful industry connections that can further their careers by strengthening the bonds between students and professionals in the field. The absence of practical corporate challenges, leadership development activities, problem-solving simulations, and networking

opportunities significantly reduces business graduates' readiness for the contemporary workplace. B-schools must place more emphasis on industry interaction, high-stakes decision-making, and experiential learning than on pointless undergraduate-style coursework if they want to build students' business acumen. Only then will they be able to develop future company executives who are capable of confidently and competently navigating the intricacies of the corporate world.

Bridging the Gap: Recommendations for B-Schools :

Redesigning Events for Managerial Growth :

B-schools need to rethink their events and teaching strategies to emphasize hands-on, industry-relevant experiences in order to close the gap between academic business education and real-world managerial issues. The objective is to give students the leadership, critical thinking, and decision-making abilities they need to succeed in the business, entrepreneurial, and investment sectors. Business schools may develop a new generation of capable, industry-ready professionals by substituting organized experiential learning programs for unnecessary undergraduate-style events.

The following are important programs that can be incorporated into B-school courses to improve managerial development:

1. Industry-Specific Case Competitions: Harvard-Style Case Method Application :

Although case competitions have been a component of business education for a long time, their effectiveness varies depending on how they are set up. B-schools must use Harvard-style case method applications, where students examine and resolve real-world, industry-specific problems, in place of general academic exercises.

- Real-Time Business Dilemmas: Examples must to come from actual companies navigating financial crises, market swings, digital change, and rivalry.
- Data-Driven Decision-Making: Students should be required to employ market research, consumer analytics, and financial models to back up their suggestions in competitions that leverage real-time industry data.
- Executive Judging Panels: To simulate real-world boardroom situations, corporate executives, venture capitalists, and industry leaders should offer input in addition to professors assessing ideas.
- High-Stakes Decision Making: Students should be taught to emulate the challenges of corporate environments by thinking like C-suite executives and making risky decisions in a timely manner.

Students can obtain practical experience in corporate problem-solving and become better equipped to handle issues in the real world by using case competitions as a strategic learning tool.

2. Live Consulting Projects: Collaboration With Companies for Problem-Solving :

Live consulting assignments, in which students collaborate with businesses to solve urgent business problems, are among the best ways to build managerial experience. Consulting projects offer practical exposure to business decision-making, in contrast to classroom-based instruction.

- **Interaction with Startups & Corporates**: Students should solve actual marketing, financial, operations, and strategy problems while working with enterprises ranging from Fortune 500 firms to early-stage startups.
- **Cross-Functional Learning:** To replicate real-world consulting teams, teams should be set up to include students from various specializations, such as finance, marketing, operations, and technology.
- **Stakeholder Presentations:** Students should give practical insights to senior executives in lieu of theoretical reports in order to get immediate input from the industry.
- **End-to-end Problem Solving:** To provide a comprehensive learning experience, projects should include financial modeling, strategy development, company research, and execution planning.

This initiative transforms students from passive learners to active business consultants, honing their problem-solving skills and strategic acumen.

3. Investment Pitch Sessions: Real-World Exposure to Venture Capital and Fundraising :

B-schools should implement investment pitch sessions where students highlight business ideas to actual investors, venture capitalists, and angel funding networks to prepare them for corporate fundraising and entrepreneurial endeavors experience.

- Support for Startup Incubation: Business schools ought to incorporate programs for startup incubation, where students get guidance on investor pitching, go-to-market strategy, and product development.

- Live Fundraising Rounds: Students should pitch to actual investors rather than competing in simulated competitions, as this could result in real funding for workable business concepts.
- Financial due Diligence Training: To simulate the real-world investment process, students should study the principles of funding agreements, equity distribution, term sheets, and valuation.
- Industry-particular Focus: To ensure that students acquire knowledge about investments particular to a given sector, pitch sessions should be structured around important industry verticals including finance, healthcare, e-commerce, and AI-driven solutions.

By exposing students to real-world investment dynamics, these sessions prepare them for both entrepreneurial success and leadership roles in venture capital-backed businesses.

4. Business Simulations & AI-Based Market Scenarios: Decision-Making under Uncertainty :

In today's fast-paced and unpredictable business environment, CEOs must navigate uncertainty and make critical decisions under rapidly changing conditions. AI-powered business simulations can replicate these high-stakes scenarios, allowing students to sharpen their decision-making skills in real time. Simulated market conditions can expose students to dynamic economic shifts, competitive threats, and industry disruptions, requiring them to adapt and strategize effectively. CEO and boardroom simulations can place students in executive roles where they must make high-level decisions regarding mergers, investments, crisis management, and product launches. Additionally, risk analysis and crisis management simulations should challenge students to respond to financial risks, supply chain failures, and PR crises under pressure. AI-powered personalized learning can further enhance these experiences by tracking decision-making patterns and providing tailored feedback, helping students identify their strengths and areas for improvement. By integrating AI-driven simulations, B-schools can create a risk-free environment where students develop the strategic thinking, leadership, and problem-solving skills necessary for real-world executive roles.

5. Leadership Development Bootcamps: Experiential Learning With Corporate Mentors :

Leadership cannot be taught through textbooks alone—it must be cultivated through hands-on learning and direct mentorship from business executives. To develop future leaders, business schools should replace traditional academic workshops with leadership development bootcamps that offer immersive, real-world training. Executive shadowing programs should pair students with senior managers, startup founders, and C-level executives, providing firsthand exposure to corporate decision-making. Crisis leadership challenges should simulate real-world scenarios, requiring students to manage operational failures, cybersecurity threats, and market disruptions. High-stakes negotiation exercises should be incorporated into coursework to enhance persuasion skills, stakeholder management, and deal-making expertise. Additionally, global leadership exchange programs should connect students with international business executives, exposing them to diverse markets and cultural perspectives.

By integrating these leadership initiatives, B-schools can ensure graduates develop the confidence, strategic mind-set, and decision-making capabilities required for corporate and entrepreneurial success. Shifting from traditional classroom instruction to industry-focused experiential learning will better prepare students for today's fast-paced business environment. Introducing industry-specific case competitions live consulting projects, investment pitch sessions, AI-driven business simulations, and leadership development boot camps will provide students with real-world leadership experience, critical thinking skills, and practical business acumen. Strengthening corporate partnerships through these initiatives will not only enhance business education but also ensure graduates are industry-ready, strategic, and well-equipped for leadership roles in modern corporate and entrepreneurial settings.

Strengthening Corporate Partnerships :

In order to bridge the gap between academic learning and practical business difficulties, it is imperative to establish robust corporate collaborations. Students at many business schools are ill-prepared for leadership positions in competitive settings because they are unable to have direct industry exposure. By actively interacting with businesses, entrepreneurs, and industry experts, B-schools can provide students with priceless chances to obtain practical experience, build professional networks, and improve their problem-solving skills.
To guarantee that business education stays current, industry-aligned, and future-focused, the following are important tactics for enhancing corporate collaborations.

1. Inviting CXOs for Panel Discussions on Real-World Challenges :

Students can gain a firsthand understanding of contemporary business issues, emerging

market trends, and challenges affecting corporate leadership through panel discussions with C-level executives (CXOs), who include CEOs, CFOs, CMOs, and CTOs. Unlike traditional lectures, these workshops provide students with experiential, real-world knowledge that is Anot found in textbooks.

To provide deep industry insights, B-school CXO panel discussions should center on pressing topics including digital transformation, sustainability, AI-driven decision-making, and foreign market expansion. These panels need to have real-world case studies where CXOs talk about their strategic decisions, crisis management experiences, and pivotal business moments. To boost student engagement, interactive Q&A sessions should allow students to ask business professionals directly about their leadership philosophies, decision-making procedures, and career advancement. To provide a comprehensive grasp of global business challenges, a multidisciplinary approach should also involve executives from a range of industries, including manufacturing, technology, healthcare, retail, and finance. By include these discussions in the curriculum, B-schools can ensure that students gain useful industry connections and gain real-world business insights.

2. Mentorship-Driven Networking Events to Connect Students With Industry Leaders :

Developing a solid professional network is one of the most beneficial outcomes of business education. Traditional networking meetings, however, frequently lack structure and purposeful interaction. B-schools must put in place mentorship-driven networking initiatives that enable students to build enduring connections with business leaders in order to improve networking chances.

Mentorship-driven networking should be a part of B-school curricula in order to give students direct access to industry and career counseling. Depending on their goals, preferred industries, and skill development requirements, each student should be connected with a senior industry leader. Networking events ought to be organized around certain subjects, such investment banking career routes, startup fundraising tactics, AI in business operations, and corporate strategy sustainability. Students can interact with several business executives in a high-impact environment through a speed mentoring approach that consists of brief, structured one-on-one sessions. Instead of restricting networking to occasional gatherings, mentorship programs ought to last for several months and incorporate business advice, career coaching, and practical project cooperation. By encouraging sustained involvement,

3. Internship-Based Learning Models Where Students Work on Live Projects :

Although internships have long been a crucial part of business education, many universities

continue to use antiquated methods that provide little opportunity for students to see actual decision-making procedures. B-schools must transition to internship-based learning models that prioritize real-world, high-impact projects above administrative duties in order to optimize learning.

How Internship-Based Learning Can Be Enhanced :

B-schools should use internship-based learning models to expose students to real-world business and provide them with hands-on experience. Instead of doing general internships, students should focus on specific business issues including financial risk assessment, data-driven consumer insights, market expansion, and technology-driven process optimization. Through cross-functional industry collaborations, students should be able to engage with departments like marketing, finance, human resources, and technology while working in interdisciplinary teams to obtain a thorough understanding of business. After completing an internship, students should evaluate their strategies, outcomes, and key lessons learned and use structured case studies to present their findings. Additionally, companies should be encouraged to recognize high-achieving children through corporate sponsorships and potential pre-placement offers.

Through the development of corporate relationships through CXO panel discussions, mentorship-driven networking activities, and internship-based learning, B-schools will transform into industry-relevant ecosystems. This approach will bridge the knowledge gap between academia and business, preparing graduates for success in strategic management, entrepreneurship, and business leadership, while also enhancing students' problem-solving, leadership, and decision-making abilities.

Evaluating Student Growth in Business Acumen :

For business schools, assessing student performance in ways other than traditional academic tests is a significant difficulty. To develop business acumen, one must actively engage in problem-solving, leadership, and strategic decision-making; lectures and assessments are insufficient on their own. To ensure that graduates have the skills necessary to thrive in corporate environments, B-schools must transition from passive participation to competency-based, data-driven assessments for student development.

1. Shift from Passive Event Participation to Active Problem-Solving Exercises :

Many business schools continue to use outdated evaluation techniques that don't always correspond to actual business competency, like attending events, comprehending theory, and doing coursework. Assessment techniques should move toward active, problem-solving activities that mimic executive decision-making in order to accurately measure business

acumen. Written exams should be replaced with case-based assessments that require students to use frameworks such as Porter's Five Forces, SWOT analysis, and financial modeling to examine and solve real-world business situations. Furthermore, real-world business issues created in partnership with businesses ought to enable students to develop and showcase marketing, finance, operations, and human resources solutions.

. Students' ability to make decisions under pressure should be put to the test in high-stress business war games that require them to change course and maximize business performance in real time. Additionally, rather than just writing business proposals, students should construct, launch, and test their concepts through entrepreneurial prototyping. Evaluations will be based on financial viability, consumer involvement, and market validation. B-schools can guarantee that students acquire critical thinking, strategic decision-making, and useful business skills that equip them for difficulties in the real world by shifting from passive learning to active problem-solving.

2. Using Analytics to Measure Leadership Skills, Decision-Making, and Strategic Thinking:

Critical qualitative abilities like leadership, negotiating, and strategic thinking are frequently overlooked by traditional grading schemes. Business schools must use data-driven, analytics-based performance tracking that offers quantifiable insights into student development in order to assess these competencies. Through team projects, case discussions, and business simulations, AI-driven leadership analytics may evaluate decision-making patterns, risk tolerance, and leadership inclinations. In dynamic company environments, behavioral data from AI-based market simulations helps monitor strategic planning skills, forecasting accuracy, and adaptability. In real-time settings, machine learning-powered decision-making scorecards can analyze the efficacy of financial decision-making, the accuracy of risk assessments, and the efficiency of problem solving.

Peer and executive assessments from business executives, startup founders, and industry mentors can also offer practical perspectives on students' business and leadership approaches. Soft skills like communication, persuasion, and bargaining can be further evaluated by AI-powered sentiment analysis techniques using recorded debates, investor presentations, and sales pitches. B-schools can guarantee that graduates acquire the critical thinking, leadership, and decision-making abilities necessary for success in business and entrepreneurship by replacing subjective academic evaluations with objective, analytics-driven assessments.

Students will be better prepared to succeed in actual business settings thanks to this transition, which will give them both academic understanding and practical competence.in fast-paced, high-pressure business settings.

Challenges & Limitations :

While the shift toward industry-aligned, experiential learning in business schools is essential, implementing these changes comes with challenges. Many institutions face resistance to change, financial constraints, and faculty adaptation issues, all of which must be addressed to transition from passive, theoretical learning to dynamic, real-world business education. Resistance to change is common, as faculty, administrators, and students may be hesitant to move away from traditional event structures due to comfort with familiarity, institutional bureaucracy, and concerns about increased complexity. Implementing pilot programs, involving corporate stakeholders, and highlighting success stories can help drive gradual adoption. Budget constraints also pose challenges, as corporate-driven case competitions, startup incubation programs, and AI-powered business simulations require significant investment. Schools can overcome financial barriers through corporate sponsorships, alumni funding, hybrid learning models, and government grants. Additionally, faculty adaptation remains a critical issue, as many professors come from academic backgrounds rather than corporate leadership roles. To bridge this gap, B-schools should offer faculty training, corporate immersion programs, co-teaching opportunities with industry leaders, and AI-enabled teaching support. By addressing these challenges through strategic planning and stakeholder collaboration, business schools can successfully implement experiential learning, equipping students with the skills needed to thrive in the modern corporate and entrepreneurial landscape.

Research Methodology :

The research **employed** a quantitative approach to investigate the impact of repetitive undergraduate-level activities in business schools on managerial growth and business acumen. A structured online questionnaire **was used** to gather data from MBA alumni.

Study Area: The research **was conducted** in Pune, which **was** home to several institutions offering MBA programs.

Sample Size: A total of 225 respondents **were surveyed** to ensure a reliable representation of alumni experiences.

Sampling Frame: The sampling frame **consisted** of alumni from seven business schools offering MBA courses in Pune. These individuals **had undergone** both undergraduate and graduate-level business education and **could provide** insights into the impact of repetitious

activities on their managerial growth.

Sampling Method: Simple random sampling **was employed** to select participants from the alumni pool. This method **ensured** that each individual in the population **had an equal chance** of being included, promoting unbiased representation in the sample.

Data Collection Instrument: A structured questionnaire **was used** to collect data. The questionnaire **was designed** to assess participants' perceptions of the differences between undergraduate and graduate business education, the impact of repeated tasks on business acumen, and their suggestions for innovative event designs to enhance managerial skills. The questionnaire **was circulated** online to reach a wider audience of alumni from the selected business schools.

Data Analysis: The data **was analyzed** using Logistic Regression to examine the relationships between the frequency of repetitive activities in business education and their impact on developing business acumen and managerial competencies. Logistic regression **was** particularly suitable for analyzing categorical outcomes, such as the presence or absence of specific managerial skills, and it **allowed** the study to control for confounding variables.

Expected Outcomes: The research **aimed** to uncover insights into the detrimental effects of repeated undergraduate activities on business acumen in graduate programs and **offered** recommendations for more effective learning strategies that fostered managerial growth.

References: All references **were formatted** according to the APA style, ensuring proper citation of academic papers, books, and other sources consulted during the research.

Results and discussion

Case Processing Summary			
Unweighted Cases		N	Percent
Selected Cases	Included in Analysis	225	100.0
	Missing Cases	0	.0
	Total	225	100.0
Unselected Cases		0	.0
Total		225	100.0
a. If weight is in effect, see the classification table for the total number of cases.			

Dependent Variable Encoding	
Original Value	Internal Value
Female	0
Male	1

Block 0: Beginning Block

Classification Table[a,b]			
		Predicted	
	Observed	Gender	Percentage Correct

			Female	Male	
Step 0	Gender	Female	0	110	.0
		Male	0	115	100.0
	Overall Percentage				51.1

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.044	.133	.111	1	.739	1.045

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Black white	.167	1	.683
		Rose	.331	1	.565
		Horror	1.007	1	.316
		Bollywood	.127	1	.722
		Indoor sports	7.644	1	.006
		Outdoor sport	.004	1	.949
		Dumseraj	.452	1	.501
		MS OFFICE	.004	1	.949
		Yoga	2.033	1	.154
		Fishponds	1.000	1	.317
		Antakshari	.074	1	.785
		Business quiz	2.285	1	.131
		Business plan	3.934	1	.047
		Mehandi	1.930	1	.165
		Sheroshayri	.162	1	.688
		Mismatch	.796	1	.372
		Poster	2.895	1	.089
		Twins day	.794	1	.373
		Mismatch	.253	1	.615
		CSR	5.019	1	.025
		Book review	.167	1	.683
		Budget	.600	1	.438
		AI apps day	.007	1	.932
		Constitution	1.205	1	.272
	Overall Statistics		33.290	24	.098

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	38.639	24	.030
	Block	38.639	24	.030
	Model	38.639	24	.030

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	273.167[a]	.158	.210

a. Estimation terminated at iteration number 20 because maximum iterations has been reached. Final solution cannot be found.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	2.163	6	.904

Contingency Table for Hosmer and Lemeshow Test

		Gender = Female		Gender = Male		
		Observed	Expected	Observed	Expected	Total
Step 1	1	19	18.998	4	4.002	23
	2	17	14.947	5	7.053	22
	3	12	12.327	9	8.673	21
	4	35	35.393	32	31.607	67
	5	10	11.082	13	11.918	23
	6	7	8.392	16	14.608	23
	7	5	5.288	16	15.712	21
	8	5	3.573	20	21.427	25

Classification Table

			Predicted		
			Gender		
	Observed		Female	Male	Percentage Correct
Step 1	Gender	Female	88	22	80.0
		Male	56	59	51.3
	Overall Percentage				65.3

a. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
								Lower	Upper
Step 1[a]	Black white	-.222	.758	.086	1	.770	.801	.181	3.539
	Rose	-.459	.804	.326	1	.568	.632	.131	3.056
	Horror	.900	.788	1.306	1	.253	2.461	.525	11.528
	Bollywood	.354	.671	.278	1	.598	1.425	.382	5.307
	Indoor sports	-1.486	.519	8.217	1	.004	.226	.082	.625
	Outdoor sport	1.463	.875	2.798	1	.094	4.320	.778	23.991
	Dumseraj	.206	.702	.086	1	.770	1.228	.310	4.865
	MS OFFICE	-.189	.836	.051	1	.821	.827	.161	4.258
	Yoga	-1.073	.691	2.414	1	.120	.342	.088	1.324
	Fishponds	.625	.759	.679	1	.410	1.868	.422	8.263
	Antakshari	-.741	.804	.848	1	.357	.477	.099	2.305
	Business quiz	-.908	.717	1.601	1	.206	.403	.099	1.646
	Business plan	1.481	.678	4.767	1	.029	4.397	1.164	16.613

	Mehandi	-20.442	28381.385	.000	1	.999	.000	.000	.
	Sheroshayri	-.645	1.092	.349	1	.554	.525	.062	4.457
	Mismatch	-.135	.273	.243	1	.622	.874	.512	1.492
	Poster	1.310	.817	2.572	1	.109	3.708	.748	18.390
	Twins day	.332	.623	.283	1	.594	1.393	.411	4.720
	Mismatch	.237	1.230	.037	1	.847	1.267	.114	14.117
	CSR	-1.391	.860	2.615	1	.106	.249	.046	1.343
	Book review	-.671	.768	.763	1	.382	.511	.113	2.303
	Budget	.924	.657	1.978	1	.160	2.520	.695	9.139
	AI app	-.258	.612	.178	1	.673	.772	.233	2.564
	Constitution	.727	.583	1.556	1	.212	2.069	.660	6.481
	Constant	39.519	56762.771	.000	1	.999	145461452913043328.000		

a. Variable(s) entered on step 1: Black white, Rose, Horror, Bollywood, Indoor sports, Outdoor sport, Dumseraj, MSOffice, Yoga, Fishponds, Antakshari, Business quiz, Business plan, Mehandi, Sheroshayri, Mismatch, Poster, Twins day, Mismatch, CSR, Bookreview, Budget, AI app, and Constitution.

1. **Overall Model Performance:**
   - The model is statistically significant (Omnibus Test p=0.030)
   - Nagelkerke R Square is 0.210, suggesting the model explains about 21% of the variance
   - Hosmer and Lemeshow Test p=0.904 indicates good model fit (non-significant means no significant difference between observed and predicted values)
2. **Classification Results:**
   - The model correctly classifies 65.3% of cases overall
   - It's better at classifying females (80.0% correct) than males (51.3% correct)
3. **Significant Predictors:**
   - **Indoor sports** (p=0.004): Negative coefficient (B=-1.486) suggests females are more likely to participate in indoor sports. Odds ratio of 0.226 means males are about 77.4% less likely to participate in indoor sports compared to females.
   - **Business plan** (p=0.029): Positive coefficient (B=1.481) suggests males are likelier to participate in business plan activities. Odds ratio of 4.397 means males are about 4.4 times more likely to participate in business plan activities than females.
4. **Near-Significant Predictors:**
   - **Outdoor sports** (p=0.094): Positive coefficient (B=1.463) suggests males tend to participate more in outdoor sports

- **CSR** (p=0.106): Negative coefficient (B=-1.391) suggests females tend to participate more in CSR activities
- **Poster** (p=0.109): Positive coefficient (B=1.310) suggests males tend to participate more in poster activities

5. **Non-Significant Variables:**
   - Most of the other activities don't significantly predict gender, including:
     - Black white
     - Rose
     - Horror
     - Bollywood
     - MS Office
     - And many others listed in the variables

This logistic regression model analyzes how various activities predict gender. The model is statistically significant with moderate predictive power. The strongest gender differences appear in:

- **Indoor sports** - more associated with females
- **Business plan activities** - more associated with males
- **Outdoor sports** - trending toward males (though not quite significant)
- **CSR activities** - trending toward females (though not quite significant)

The overall accuracy of 65.3% suggests the model has some predictive value, but there's still substantial unexplained variation in gender preferences for these activities.

Table- Level of Participation

S.N	NAME	INTAKE	RESPONSES	% OF PARTICIPATION
1	INSTITUTE1	120	33	28%
2	INSTITUTE2	120	30	25%
3	INSTITUTE3	120	35	29%
4	INSTITUTE4	120	30	25%
5	INSTITUTE5	120	33	27%
6	INSTITUTE6	120	28	23%
7	INSTITUTE7	120	36	30%
	TOTAL	840	225	

This table presents participation data for seven institutes with the following key points:

1. **Consistent intake**: Each institute had the same intake capacity of 120 participants.
2. **Response rates**:

- The highest response rate came from INSTITUTE7 with 36 responses (30%)
- The lowest response rate came from INSTITUTE6 with 28 responses (23%)
- The average response rate across all institutes was approximately 27%

3. **Overall participation**: Out of a total possible 840 participants, only 225 responded, giving an overall participation rate of about 27%
4. **Participation range**: The participation rates across institutes are consistent, ranging from 23% to 30%, suggesting similar engagement levels throughout.
5. **Possible implications**:
   - The relatively low overall participation rate (27%) might indicate challenges in engagement or data collection
   - The consistency across institutes suggests this is likely a systematic issue rather than isolated to specific institutes

Conclusion :

Repeating undergraduate activities in business schools significantly dilutes business acumen and limits managerial competency, as it fosters a superficial understanding of business concepts rather than cultivating the critical thinking and strategic decision-making skills required in dynamic corporate environments. Business education must evolve beyond cultural festivals, routine classroom lectures, and generic academic discussions, which, while fostering social engagement, do little to prepare students for the complexities of real-world business challenges.

To make business education more effective, schools should focus on learning by doing. This includes industry-focused projects that give students real-world experience, develop their problem-solving skills and foster innovation. Specifically, schools can organize live case competitions where students face challenging business scenarios and must develop practical solutions. In addition, incorporating venture incubation programs into the curriculum allows students to build and refine their business concepts, supported by mentors from the industry.

Furthermore, B-schools must prioritize leadership networking initiatives, offering students direct engagement with business leaders, industry veterans, and potential investors. Such interactions help students build professional networks, facilitate knowledge exchange, and provide valuable insights into industry trends and executive decision-making.

Incorporating AI-driven business simulations is also crucial to modern business education. These simulations allow students to experience the consequences of strategic decisions in a

controlled, risk-free environment, enhancing their ability to navigate complex business scenarios and make data-driven decisions. By leveraging artificial intelligence, B-schools can create personalized learning experiences that adapt to students' strengths and weaknesses, ensuring a more effective and immersive learning process.

By embracing these experiential learning models, business schools can equip graduates with the competencies required for high-stakes managerial roles and entrepreneurial success, ensuring they emerge as well-rounded, industry-ready professionals capable of leading in an ever-evolving business landscape.

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The Impact of Artificial Intelligence (AI) on Digital Business

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Abstract: Artificial Intelligence (AI) has significantly transformed the landscape of digital business. By integrating AI-driven solutions, organizations can optimize operations, enhance customer experiences, and improve decision-making processes. This paper examines the impact of AI on digital business, analyzing its applications, benefits, challenges, and future implications. The study concludes that AI is a crucial enabler of digital transformation, fostering innovation and competitive advantage while presenting ethical and implementation challenges. This research article delves into the profound impact of artificial intelligence (AI) on digital Business. With the rapid development of AI technologies, marketers are leveraging its proficiencies to enhance customer engagement, optimize promotion strategies, and drive business growth. This paper provides a comprehensive analysis of the various ways AI is revolutionizing digital Business, including data analysis, personalization, predictive analytics, chatbots, SEO, voice search, and marketing automation. Through an in-depth examination of Business movements, case studies, and scholarly research, this article offers valuable insights into the transformative role of AI in shaping the future of digital Business

Keywords: *Artificial Intelligence, Digital Business, Data Analysis, Personalization, Predictive Analytics, Chatbots, Content Creation, Advertising Optimization, SEO, Voice Search, Marketing Automation.*

Introduction:

The rapid advancement of AI technologies has reshaped digital business models. AI-powered automation, machine learning, and data analytics have enabled businesses to streamline processes and drive efficiency. AI is now embedded in various aspects of business operations, from customer service to financial forecasting and marketing automation. Companies leveraging AI can gain a competitive advantage by improving accuracy, reducing costs, and providing superior customer experiences.

The integration of AI in digital businesses is not just a technological evolution but also a strategic necessity. AI facilitates real-time data processing, allowing businesses to anticipate consumer preferences and market trends with greater precision. Moreover, AI-driven tools enable businesses to automate repetitive tasks, enhance cybersecurity, and develop

personalized marketing strategies. As a result, AI is revolutionizing traditional business models and fostering the development of new, innovative digital ecosystems.

Despite its numerous advantages, AI implementation also presents several challenges, such as data privacy concerns, ethical considerations, and the need for continuous adaptation. Organizations must navigate these complexities while ensuring transparency and responsible AI usage. This paper explores how AI influences digital business, highlighting its role in enhancing productivity, customer engagement, and strategic decision-making.

Objectives:

1. To analyze the role of AI in digital business transformation
2. To explore key AI applications in digital businesses
3. To examine challenges and ethical considerations

Literature Review:

Relevant Studies: Several studies have examined the role of AI in digital business, highlighting its impact on automation, customer relationship management, and data analytics. Researchers have identified AI as a key driver of digital transformation, influencing operational efficiency and competitive advantage. Studies have shown that AI adoption leads to improved productivity, better decision-making, and enhanced customer satisfaction.

Research conducted by Davenport and Ronanki (2018) emphasizes the growing importance of AI in business strategy, highlighting how AI contributes to process automation, cognitive insight, and intelligent engagement. Similarly, McKinsey & Company (2020) found that companies using AI-based data analytics experience a 20-30% increase in revenue due to improved customer insights and market forecasting.

In addition, Brynjolfsson and McAfee (2017) discuss how AI is redefining competitive advantages in digital business by enabling real-time adaptation to market trends. They argue that companies integrating AI into their operations not only enhance efficiency but also achieve higher innovation potential. Furthermore, AI is found to improve personalization in digital marketing, as highlighted by Chen and Zhang (2019), who show that AI-driven recommendation systems increase customer engagement and sales conversion rates.

Theoretical Framework: This study is based on technological innovation theories and digital transformation frameworks. AI's impact is analysed through the lens of business process reengineering, strategic management perspectives, and the diffusion of innovation theory. These theories provide insights into how AI is integrated into business processes and the factors influencing its adoption and success.

The Diffusion of Innovation Theory (Rogers, 2003) explains how AI adoption spreads across businesses and industries. According to this theory, early adopters of AI gain a significant competitive edge as they capitalize on AI-driven automation, efficiency, and personalization. Another relevant framework is the Resource-Based View (RBV) of the firm, which suggests that AI serves as a valuable and rare resource that provides long-term competitive advantages.

From an economic standpoint, the Productivity Paradox (Solow, 1987) is also relevant, as it explores the potential lag between AI adoption and measurable productivity gains. Recent studies argue that AI's benefits may take time to materialize as businesses restructure their processes to fully integrate AI capabilities.

Furthermore, ethical considerations in AI adoption are rooted in the principles of Responsible AI and algorithmic transparency (Floridi et al., 2018). Ensuring that AI operates without bias, respects privacy, and aligns with ethical business practices is a critical aspect of successful AI integration in digital businesses.

The Evolution of Artificial Intelligence in Digital Business : Artificial intelligence (AI) has undergone a remarkable evolution within the dominion of digital Business, fundamentally restructuring how businesses interact with consumers and conduct promotion activities.

This section provides a historical overview of Artificial Intelligence in digital Business, explores the emergence of Artificial Intelligence technologies, and observes their integration into promotion practices.

Historical Overview: The roots of Artificial Intelligence Businesses can be traced back to the early 2000s when rudimentary forms of machine learning algorithms were first applied to analyse consumer data and automate certain promotion tasks. However, it was not until the beginning of big data and advancements in computing power that Artificial Intelligence started to revolutionize digital Business on a larger scale. In the 2010s -MID, the rise of social media platforms and the explosion of digital devices fuelled the need for more sophisticated promotion strategies. Marketers pursued ways to harness the vast amounts of data generated by online interactions to gain deeper insights into consumer behavior and preferences.

This demand paved the way for the integration of AI technologies into marketing platforms and tools.

Emergence of AI Technologies: The emergence of AI technologies such as machine learning, natural language processing (NLP), and deep learning has been instrumental in driving innovation in digital Business. Machine learning algorithms have enabled business to

analyse large datasets and extract valuable insights to inform decision-making processes. NLP, on the other hand, has empowered business to understand and interpret unstructured data such as text and speech, facilitating the development of chatbots, virtual assistants, and sentiment analysis tools.

Deep Learning Techniques: (DLT) inspired by the structure and function of the human brain, have further enhanced the capabilities of Artificial Intelligence systems, empowering them to perform complex tasks such as image recognition and natural language understanding with remarkable accuracy.

Adoption and Integration in business Practices: As Artificial Intelligence technologies matured and became more accessible, marketers increasingly embraced them to optimize their digital Business efforts. data analysis and segmentation to personalized content creation and predictive analytics,

Artificial Intelligence has become global across various promotion channels and platforms. One of the key areas where Artificial Intelligence has made a significant impact is in customer relationship management (CRM) systems. Artificial Intelligence -powered CRM platforms utilize (MLA) machine learning algorithms to analyse customer data, predict buying behaviors, and automate personalized relations with customers. This not only improves customer satisfaction but also increases sales and profits for businesses. In addition to CRM, Artificial Intelligence has revolutionized digital promotion by enabling marketers to target audiences more effectively, optimize ad placements, and measure campaign performance in real-time. Programmatic publicity platforms leverage Artificial Intelligence algorithms to automate the buying and selling of ad inventory, resulting in more efficient and cost-effective promotion campaigns.

Moreover, AI driven chatbots and virtual assistants have changed customer service by providing instant support and personalized recommendations to customers. These conversational Artificial Intelligence agents can understand (NLP) natural language queries, resolving issues, and guiding Customers through the sales funnel, thereby enhancing overall users experience.

The evolution of Artificial Intelligence in digital business has been characterized by a gradual development from experimental applications to extensive adoption and integration into promotion practices. As Artificial Intelligence technologies continue to advance, marketers must adjust to these changes and leverage Artificial Intelligence driven solutions to stay competitive in an increasingly digitalized business.

AI Applications in Digital Business:

- Customer Experience Enhancement: AI-powered chatbots, personalized recommendations, and voice assistants have revolutionized customer interactions, improving satisfaction and engagement.
- Data-Driven Decision Making: Machine learning algorithms analyze vast datasets to provide actionable insights, aiding businesses in making informed strategic choices.
- Process Automation: AI-driven robotic process automation (RPA) reduces manual tasks, increasing efficiency and reducing operational costs.
- Cybersecurity: AI enhances threat detection and response mechanisms, strengthening data security in digital business environments.

Benefits of AI in Digital Business:

- Increased Efficiency: AI automates repetitive tasks, enabling businesses to allocate resources effectively.
- Enhanced Personalization: AI tailors user experiences, improving customer loyalty and conversion rates.
- Cost Reduction: Automation minimizes human intervention, reducing labor costs and improving profitability.
- Scalability: AI enables businesses to scale operations without significantly increasing costs.

Challenges and Ethical Considerations:

- Data Privacy Concerns: AI-driven data processing raises concerns about user privacy and data security.
- Workforce Displacement: Automation may replace traditional jobs, necessitating workforce reskilling and upskilling.
- Bias and Fairness: AI algorithms may inherit biases from training data, impacting decision fairness.
- Implementation Complexity: Integrating AI solutions requires significant investment and expertise.

Future Implications and Trends: The future of AI in digital business involves greater advancements in predictive analytics, AI-driven marketing, and improved human-AI collaboration. Businesses must adopt ethical AI practices to ensure responsible AI usage and mitigate risks associated with bias and data privacy.

Conclusion: AI has become a cornerstone of digital business transformation, offering numerous benefits while posing challenges that must be addressed. The integration of AI in digital business enables organizations to optimize operations, drive efficiency, and deliver enhanced customer experiences. The rapid evolution of AI technologies will continue to shape the future of digital commerce, requiring businesses to stay ahead by adopting innovative AI solutions.

However, organizations must approach AI implementation with caution, ensuring transparency, fairness, and ethical considerations in decision-making. Issues such as algorithmic bias, data privacy, and workforce displacement must be managed effectively to promote responsible AI usage. Additionally, businesses must invest in workforce reskilling programs to mitigate job displacement concerns and create new opportunities for employees in AI-driven roles.

Looking ahead, AI's role in digital business will expand with advancements in natural language processing, deep learning, and autonomous decision-making. Organizations that strategically align AI with business objectives will gain a competitive advantage and drive long-term sustainability in the digital economy. Future research should focus on AI governance frameworks, ethical AI policies, and strategies for maximizing AI-driven business growth while minimizing risks.

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A New Education Policy (NEP): Its Relavance and Impact on B-School

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Abstract: The National Education Policy (NEP) 2020 has brought about a change in the Indian education ecosystem since its release. Its farreaching influence can be seen in the many changes it initiated, such as curriculum change, use of regional languages as educational tools, communication integration of technology in education, professional, technical support, and communication. Difference between learning and different knowledge strategies. This policy basically developed with the goal of transform in education by focusing on critical thinking, holistic development and global perspectives. It has incorporated several changes in education system. It also aimed to modernize India's education system, focusing on inclusivity, foundational literacy, and new education structure. It has a focus on to make education more inclusive, equitable and rooted in India's culture while equipping students with 21st century skills. This study shows the functioning of NEP and its impact on business management schools. To make the India global knowledge super power. It creates impact from school to college to hiring.

Keywords*: New Education Policy, education, business school, multidisciplinary, holistic approach*

Introduction:

The National Policy on Education (NPE) is a policy formulated by the Government of India to promote and regulate education in India. The policy covers elementary education to higher education in both rural and urban India. The first NPE was promulgated by the Government of India.

The aim of India's education reform is to "No child will be left behind "Its aim is to fill the existing gap in education. So, we can say that NEP 2020 has started to "learn". On the higher education front, the 2020 NEP provides great insights and recommendations on various aspects of education, including the transition to multidisciplinary teaching and learning, appropriate institutional governance, promoting good research by establishing a national

research base, and continuing education.

Objectives of Study:

1. To understand NEP 2020.
2. To study the impact of NEP 2020 on business school.

Brief History and Rationale of study:

The National Policy on Education (NPE) is a policy formulated by the Government of India to promote and regulate education in India. The policy covers elementary education to higher education in both rural and urban India. The first NPE was promulgated by the Government of India by Prime Minister Indira Gandhi in 1968, the second by Prime Minister Rajiv Gandhi in 1986, and the third by Prime Minister Narendra Modi in 2022 .[1]

Since the country's independence in 1947, the Indian government sponsored a variety of programmes to address the problems of illiteracy in both rural and urban India. Maulana Abul Kalam Azad, India's first Minister of Education, envisaged strong central government control over education throughout the country, with a uniform educational system. The Union government established the University Education Commission (1948–1949), the Secondary Education Commission (1952–1953), University Grants Commission and the Kothari Commission (1964–66) to develop proposals to modernize India's education system. The Resolution on Scientific Policy was adopted by the Government of Jawaharlal Nehru, India's first Prime Minister. The Nehru government sponsored the development of high-quality scientific education institutions such as the Indian Institutes of Technology. In 1961, the Union government formed the National Council of Educational Research and Training (NCERT) as an autonomous organization that would advise both the Union and state governments on formulating and implementing education policies.

Evolution of Education Policy :

- University Education Commission (1948-49)
- Secondary Education Commission (1952-53)
- Education Commission (1964-66) under Dr. D.S. Kothari
- National Policy on Education, 1968
- 42nd Constitutional Amendment, 1976-Education in Concurrent List
- National Policy on Education (NPE), 1986
- NPE 1986 Modified in 1992 (Program of Action, 1992)
- T.S.R. Subramaniam Committee Report (27 May, 2016)
- Dr. K. Kasturirangan Committee Report (31 May, 2019)

On July 29th, 2020, the Indian Education System noticed a historical decision made by the

Union Cabinet, the New Education Policy. On this day, the Ministry of Education announced the major reforms in the educational structure under the newly laid National Education Policy (NEP) 2020. Education policies are usually revised every few decades. The first came in 1968, the second in 1986, and the third reformation of the Indian education culture was seen in 2020.

NEP is the first organization to reform the current education system to be more integrated, collaborative and holistic. The New Education Policy 2020 will be used in many areas such as experience, opinion research, strategic advice and lessons learned from best practices. Educational standards can take India at par with world leaders. Let's understand the important changes proposed by this new NEP.

Key points of the new education policy:

The school will now be divided into 5 + 3 + 3 + 4 Levels: primary school, preparatory school, primary school and secondary school.Technical education will be combined with a 10day internship starting from the 6th grade.Students who drop out will be able to complete their diplomas after the break. Everyone can bring out the best in themselves. This will definitely make India a world-class knowledge superpower. Some highlights of NEP 2020

Impact of New Education Policy (NEP) 2020 :

This national education policy will affect the lives of millions of people. However, the two main groups affected are "students and teachers".

NEP 2020 will provide new education to students. Its greatest impact will be the transformation of the student's learning environment and learning. New education policy:

It will monitor the development of students' skills and abilities. And not academic.

According to a KPMG report, nearly 30% of students in India drop out of school after class 10.

With so many ways to grow, students' curiosity and confusion will increase. Therefore, it has been recommended to appoint experts and experts so that they can make good business decisions. So the Indian government also has something to tell teachers.

Implications for teachers:

According to the KPMG report, 13% of secondary school teachers in India are unqualified. Teaching skills. Find out what teachers will gain from the new education policy:

Introduction of professional teaching models.Training to monitor and improve your skills. A knowledgeable child. It is the development of body and mind towards their highest potential. Anonymous.Teachers teach students not only to achieve academic success, but also to make the right career decisions. Therefore, they should be equipped with new age training. This is a

6hour course designed for teachers who want to transition to a new way of teaching.

Teacher's Role as Career Counselor:

Students expects teachers to not only complete the course but also provide guidance for future interests. They spend most of their time at school, so no one understands their needs better than their teachers.

The teacher is their first job guide. He advises students to choose the right syllabus, right course, andethics to enhance their education and most importantly helps them find a good job.

Teachers need training and understanding in the counseling profession to help students and fulfill these important responsibilities.

To advance advanced career education and be effective in teaching students, teachers must participate in Univariety's Global Career Mentoring Program in collaboration with UCLA Extension. This is an allinone guide for teachers and counselors who learn about professional education, from methods and standards to best practices. As a teacher, it is your responsibility to answer all these questions. You can help students in many ways. Some of them are mentioned here: SelfAssessment Mode: This is the best way to understand how students normally look at the world and make decisions. This personality test allows you to understand your students' likes and dislikes. Identify nonjudgmental ways to understand the issues students face.

Multiple Intelligence Tests: With this test, you can match a student's intelligence with the profession he is most suitable for. It evaluates students' cognitive abilities, IQ, etc. You can measure and analyze it. Examines students' learning preferences, showing how they like to study, focus and learn. Which stream to choose?

Teachers should determine the language, number, writing, location and ability of the students. Based on the results, you can teach what works best for your students. Options: Once the stream is selected, students will be asked for options. You will find endless possibilities for combinations in a single stream. All you have to do is help students find what's best for them. Use your experience and expertise to guide students to the right career path.

Impact, Effective Governance and Its Relevance On B-School (HEIS):

Quality Management and Leadership of Universities Through appropriate process of recognition and level of self-governance, continuously over a period of 15 years, all universities in India will be independent and autonomous in the pursuit of innovation and mechanism of excellence. Envision. Corporate Governance Based on Academic, Administrative and Financial Autonomy.

Every university has a Board of Directors. All leadership jobs and leaders of the organization will be given to people who have high academic ability, demonstrate management and leadership skills, have the ability to manage difficult situations. Care will be encouraged. Higher education General umbrella - Higher Education of India (HECI) - and independent body that sets standards - General Education Commission - Higher Education Accreditation (HEGC); - National Higher Education Regulatory Commission (NHERC). The policy will be "small but firm" with the aim of ensuring the integrity of the economy and the integrity of public reason, eliminating conflicts of interest and presenting itself as a model rather than censorship.

The regulator will intervene anonymously in the regulatory process and will have the power to penalize universities that do not comply with standards and norms. Public and private universities will be subject to regulatory, accreditation and academic standards.

Conclusion:

The new Education Act 2020 aims to improve the current education system in India and make it more educational. Students will be given the best opportunity for researchbased research. Teachers will have the opportunity to learn advanced teaching skills.

Teachers should develop counseling and training activities to help students and make them aware of the new education policy. The policy aims to reform the country's education system to be more successful, flexible and responsive to the needs of 21st century students and society. The implications of NEP 2020 on education management areInterdisciplinary approach: NEP 2020 promotes interdisciplinary approach to education, including educational management. It encourages the breaking down of rigid silos between different disciplines and encourages collaboration. This approach enables students in management studies to gain a broad perspective and better understand all aspects of business and management. Including students who follow academic management. It encourages schools to offer a variety of management courses and majors, allowing students to choose courses based on their interests, skills, and career goals. It aims to encourage students, including management students, to become entrepreneurs by providing them with the necessary support, guidance and exposure to business copyrelated work. It also includes management training. By promoting the use of technology in teaching and learning, it improves general education, encourages research, and prepares students for the digital economy. Including academic administration. It encourages management organizations to focus on research projects, contribute to the development of management knowledge and solve global business problems through research. Schools, including school management programs. The aim is to provide better education for their

students by improving their teaching skills, research capacity and work experience. This is especially important in management education, where the business world is influenced by internships and vocational programs that play an important role in preparing students for the world. To improve students' knowledge and skills. In the context of technical education, this means developing skills, problem solving and critical thinking. It encourages administrators to maintain high academic standards and provides support for accreditation and quality assurance. Management education is an important part of the education system and NEP 2020 aims to improve its results and qualifications to meet the changing needs of the global economy and the people of the same.

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A Study of Issues on Production Control in Large-Scale and Small-Scale Industries at Pune District

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Abstract : There has been consensus that production control in large scale industries is a vital research field, yet with few literature reviews on this topic. This paper sets out to propose some hot issues in the current research, through a review of related literature from the perspective of operations management. In addition, we generate some insights and future research directions in this field.

Key words: *Production control systems, production planning and control, literature review, Large-Scale Industries,*

Introduction :

According to Burbidge (1990), production control (PC)is the function of management which plans, directs and controls the material supply and processing activities in an enterprise'. The problem with regard to PC is to determine when and how much to produce in a given manufacturing system in order to satisfy a set of objectives (Liberopoulos and Dallery, 2000). One of the most important activities of PC is what Burbidge (1990) calls ordering. Burbidge defines ordering as the second level of scheduling in production control, which is concerned with regulating the supply of both manufactured parts and bought items, in order to meet the production programme. This activity is performed by production control systems (PCS), which González and Framinam (2009) define as being a set of rules defining order release and material flow control in a manufacturing system. This paper discusses these systems.

Organizations adopt numerous business improvement methodologies to improve business

performance, production control in large scale industries has been regarded to be the crucial factor for the companies to obtain competitive edge. In fact, production control in large scale industries has received attention since the early 1980s, yet conceptually the management of production control is not particularly well understood, and many authors have highlighted the necessity of clear definitional constructs and conceptual frameworks on production management. In this paper, we provide a tutorial on the current research of operations management of production control in large scale industries. We first clarify the conception of production control in large scale industries in this paper, which defines the scope of our related research papers. The core of this paper is that we provide several hot issues in this field with examples to show how these researches contribute from different research angles. Finally, we conclude the paper with the insights obtained from our analysis and future study directions in this field.

The paper is organized as follows. In the next section, we specify the definitions of the terms of production control used in our paper, with a comparison between these two popular conceptions. In Section 3, which is the core section of this paper, we provide several hot topics in current research with detailed examples. In Section 4, we provide insights and further research directions.

Conception and Scope :

Production : Production is a process of combining various material inputs and immaterial inputs (plans, know-how) in order to make something for consumption (output). It is the act of creating an output, a good or service which has value and contributes to the utility of individuals. The area of economics that focuses on production is referred to as production theory, which in many respects is similar to the consumption (or consumer) theory in economics

Production Control is the management of the flow of goods between the point of origin and the point of consumption in order to meet some requirements, for example, of customers or corporations. The resources managed in production control can include physical items, such as food, materials, animals, equipment, and liquids, as well as abstract items, such as time, information, particles, and energy. The production of physical items usually involves the integration of information flow, material handling, production, packaging, inventory, transportation, warehousing, and often security. The complexity of logistics can be modelled, analyzed, visualized, and optimized by dedicated simulation software. The minimization of the use of resources is a common motivation in production for import and export.

As we can see, the concept of production control focuses on the product flow, which is the

meaning by which this word has been translated in Indian. It also puts emphasis on the activities of handling product, which include the storage, transportation, distribution, and packaging and processing. Although business logistics involves many activities, the traditional research of operations management on production control mainly relates to the fields of logistics facility, transportation, and inventory planning.

Production and Control : Production control is some scientific procedure to regulate an orderly flow of the material and co ordinate various production operations to accomplish the objective of producing desired item in right quantity of desired quality, at the required time by the best and cheapest method i.e. to attain highest efficiency in production. The Process of planning in advance of operations, establishing the exact route of each individual item, part of assembly, setting, starting and finishing dates for each important item, assembly, and the finished products, and releasing the necessary orders as well as initiating the required follow-up to effective the smooth functioning of the enterprise."

Production Control: Meaning, Levels, Factors, and Objectives All organizations irrespective of size, use production control to some degree. In small organizations, the production control may be performed by one person; but in large complex industries, the production control department is normally well-organized and highly specialized. Production control presupposes the existence of production plans, and it involves the use of various control techniques to ensure product performance as per plans. Coordinating men and materials and machines are the task of production control. Thus, production control regulates the orderly flow of materials in the manufacturing process from the raw material stage to the finished product.

Production control aims at achieving production targets, optimum use of available resources, increased profits through productivity, better and more economic goods and services, etc. An effective production control system requires reliable information, sound organization structure, a high degree of standardization and trained personnel for its successful operation.

Hot Issues : Due to the extensive research ranges in operations management of Production and Control in large scale industries, we cannot possibly make a comprehensive review in one paper. In this section, we point out several of the most important issues and hot topics in recent research, which draws great attention from both academy and industry.

Objective:

1. To study the Limitations of Production Control in selected Large scale and Small – scale industries.
2. To study the issue on Production Control in various large-scale and Small –Scale

industries in Pune Zone.

3. To study the awareness and usage of Production Control in various functions of Large-scale and Small –Scale industries in Pune Zone.

Hypotheses of Study:

1. H1: -There is significant difference across limitations of production control in in selected large scale and small scale industries.
2. Ho. -There is no There is significant difference across limitations of production control in in selected large scale and small scale industries.
3. H2: -There is significant difference across the awareness and usage about production control practices in large and small scale industries gives positive impact on business Performance.
4. H0: - There is no significant difference across the awareness about production control Practices in large and small scale Industries gives positive impact on business performance.

Inventory and Transportation Management on Specific Fields:

As has been pointed out in the previous section, the operations research on production control still mainly focuses on the traditional domain, that is, the inventory (including production planning) and transportation management. However, a noticeable phenomenon is that most papers are putting emphasis on specific fields with remarkable features captured into their models and thus making new contributions to the literature.

For example, the inventory management of perishable products (also referred to as deteriorating product) is a rather old and mature field in production and Control management, with replenishment policies for inventory being the main focus of study. Whitin investigated such a problem, where fashion goods deteriorating at the end of certain storage periods were considered. Since then, considerable attention has been paid to this line of research. A more updated review is given in Blackburn and Scudder's paper. However, new models can still be developed to capture the current management feature and obtain new managerial insights. Generally, two types of perishable loss, quantity loss and quality loss, may take place for a perishable product. The majority of the literature has dealt mainly with only one type of loss. In this regard, Chang. adopt a stochastic model to study a production control in which a distributor procures from a producer a quantity of a fresh product. During the transportation process, the distributor has to make an appropriate effort to preserve the freshness of the product, and his success in this respect impacts both the quality and quantity of the product delivered to the market Chang further extend the model into a 3-stage production control with

outsourcing transportation involved.

Another important field is transportation. It is generally known that the research on VRP (vehicle routing problem) and its various extensions has been extensive. However, other new domains on transportation can still be interesting topics. For example, the remarkable growth in intermodal transportation over the past decade has not been matched by a comparable level of academic activity, and, hence, the research on intermodal transportation appears to have a great potential. Chang explores one of the intermodal operational issues how to select best routes for shipments through the international intermodal network. The problem is formulated as a multi objective multimodal multi commodity flow problem with time windows and concave costs, and an efficient heuristic is proposed. Vermaa and Verter present a first attempt for the development of an analytical framework for planning rail-truck intermodal transportation of hazardous materials by developing a bi-objective optimization model to plan and manage intermodal shipments to represent the current practice; the routing decisions in the model are driven by the delivery times specified by the customers. Bruns and Knust study the problem of load planning for trains in intermodal container terminals. The objective is to assign load units to wagons of a train such that the utilization of the train is maximized and setup and transportation costs in the terminal are minimized. Bruns et al. further study the problem of robust load planning for trains in intermodal container terminals. The goal of load planning is to choose wagon settings and assign load units to wagons of a train such that the utilization of the train is maximized and setup and transportation costs in the terminal are minimized. García et al. adopt a new hybrid approach by combining OR techniques with AI search methods in order to obtain good quality solutions for complex intermodal transport problems, by exploiting the benefits of both kinds of techniques. The solution has been applied to a real-world problem from one of the largest Spanish companies using intermodal transportation.

Sourcing and Marketing in Production Control :

Sourcing is the first step in a Production Control. The research on sourcing has been extensive in recent years. This leaves open room for a supplier to improve efficiency over time by further optimizing the production processes. In general, OEMs' shifting of more development and engineering work, which require complex tasks and customized products, to their suppliers implies a significant potential for a supplier to accumulate knowledge and experience from learning, thus reducing costs over time. This dynamic change of supply costs affects the negotiation of sourcing contracts.

A noticeable issue is the utilization of auctioning in the sourcing strategy. One of the first

researches in this regard might be Chen's, which studies a procurement problem with one buyer and multiple potential suppliers who hold private information about their own production costs. An optimal procurement strategy is considered for the buyer who first specifies a payment for each possible purchase quantity and then invites the suppliers to bid for this contract. The auction can be conducted in many formats such as the English auction, the Dutch auction, the first-priced auction, sealed-bid auction, and the Vickrey auction. Chen and Vulcano study a production control where an upstream supplier auctions his inventory or capacity as a bundle, which formulates the problem as a two-stage production control comprising a single supplier and two resellers. Huh and Janakiraman study periodic-review inventory replenishment problems with auctions and other sales channels and show that the optimality of (s, S) inventory replenishment policies extends well beyond the traditional sales environments studied so far in the inventory literature. Chen. Study a production control in which a single buyer wishes to procure a package of products or services from various competing suppliers that possess private cost information and show how the buyer can optimize his/her profit and at the same time coordinate the channel by using a contract scheme involving auctions, audits, and profit sharing.

For a supplier that provides critical and customized components, the demand closely depends on, and hence is susceptible to, the variation of the final product demand. In the automotive industry, unstable and uncertain domestic volume of individual models is cited as one of the biggest challenges faced by manufacturers due to increased consumer choices. The consumer electronics industry is notorious for risk stemming from short product life cycles and high demand uncertainty. Furthermore, there is typically more uncertainty about the future demand than about the current demand. This demand uncertainty adds another source of future uncertainty, besides possible supplier switching (in a short-term relationship), that influences the decision of initial capacity investment.

Production Issues :

Production is the core of any business organization having its operations on an international scale. International business firms must look closely at production factors for profitability and sustainability. Production refers to manufacturing, acquiring, and developing products for the business market.

Factors that Affect Production :

There are three major areas an international organization must focus on in order to increase its production efficiency. They are −

- Facility Location

- Scale of Operation
- Cost of Production

We will look into each of them in the following sections.

Facility Location :

Facility Location refers to the appropriate location for the manufacturing facility; it should have optimum access to customers, workers, transportation, etc.

The main goal of an organization is to satisfy and delight customers with its product and services. The manufacturing unit plays a major role in this direction. One of the most important factors for determining the success of a manufacturing unit is its location.

- To get commercial success and retain its competitive advantage, any international business firm would pay attention to the following critical factors while choosing its business location
- Customer Proximity − Customer proximity is important to reduce transportation cost and time.
- Business Area − Having other manufacturing units of similar products around the business area is conducive for facility establishment.
- Availability of Skilled labor − There should be skilled labor available in and around the facility location.
- Free Trade Zone − Free-trade zones usually promote and augment the establishment of manufacturing facility by offering incentives in custom duties and applicable levies.
- Suppliers − Continuous availability and quality supply of the raw materials influences in determining the location of production facility.
- Environmental Policy − As pollution control is very important, understanding of environmental policy for the facility location is critical.

Scale of Operations :

Scale is the synonym for size in business. Business organizations can leverage on their size by making dealings, favorable terms, and volume-discounts with other firms.

Operating the business at scale means allocating and optimizing resources to get the greatest results and volume in all market segments. It is linked with optimization, not duplication, of efforts. Keeping costs under control while increasing the sales offers the opportunity for reducing costs and acquiring new customers, and more market share, without lowering the average margin (economies of scale).

Small-Scale Business − Also termed a small business, a small-scale business employs a small

number of workers and does not have a high volume of sales. The U.S. Small Business Administration states that small-scale businesses have fewer than 500 employees. Financially, a non-manufacturing small-scale business is one that earns below or equal to $7 million a year.

Large-Scale Business − Based on the home country and the industry, a small-scale company usually employs between 250 and 1,500 people. Anything above that is a large-scale company.

Economies of Scale − It refers to the cost advantages that a business obtains due to its size, output, or scale of operation. Usually, cost per unit generally decreases with the increasing scale, as fixed costs are spread out over more products.

Cost of Production:

It is a cost incurred by a company in manufacturing a product or delivering a service. Production costs depend on raw material and labor. To determine the cost of production per unit, the cost of production is divided by the total number of units produced. It is important to know the cost of production to better price an item or a service and to decide its total cost to the company.

Cost of production includes both Fixed and Variable Costs.

- Fixed costs do not change with the level of output. They usually include rents, insurance, depreciation, and set-up costs. Fixed costs are also known as overhead cost.
- Variable costs refer to those costs which vary with the level of output, and are also known as direct costs or avoidable costs. Examples include fuel, raw materials, and labor costs.

Make-or-Buy Decisions :

Make-or-buy decisions are taken to arrive at a strategic choice between manufacturing an item internally (in-house) or buying it externally (from an external supplier). The buy side of the decision is also known as outsourcing. Make-or-buy decisions of a firm is important when it has developed a product or part – or significantly modified a product or part – but is having problems with the current suppliers, or has decreasing capacity or changing demand.

The major reasons for manufacturing an item in house includes the following −

- Cost attributes (less expensive to make)
- Intentions to integrate the operations
- Productive use of excess plant capacity (using present idle capacity)
- For direct control over production / quality
- When design secrecy is applicable to protect proprietary technology

- Unreliable / incompetent suppliers
- Very small quantity of production
- Controlling lead time, transportation, warehousing costs
- Political, social, or environmental pressure

Buy decisions are applicable under the following conditions −

- Insufficient local expertise
- Cost considerations (less expensive)
- Small-volume requirements
- Limited production or insufficient capacity
- Intentions to maintain a multiple-source policy
- Indirect managerial control factors
- Procurement and inventory factors
- Brand preference

Advantages and Disadvantages of Large Scale Production:

Advantages of Large Scale Production:

The following are the merits of large scale production:

1. Internal Economies: Internal economies arise within the firm because of the expansion of the size of a particular firm. They are called the economies of scale.

2. External Economies: External economies arise with the expansion of the industry. These are generally the result of large scale production and are associated with the advantages of localisation

3. Division of Labour: The large scale production is always associated with more and more division of labour. With the division of labour, per worker output increases. Hence, per unit labour cost is reduced in large scale production,

4. Use of machines: The large scale production always makes use of machines. So, all the advantages of the use of machinery are available.

5. More Production: The large scale industries can produce more goods. For instance, a big sugar factory can use molasses to make spirits and thus can reduce the cost of production of sugar.

6. Economies of Organisation: With an increase in the size of the firm, the cost of management is reduced.

7. Low Cost of Production: The large scale production gives many types of economies. Suppose, there are two different factories, each producing 500 units of a commodity. For these two factories, there must be two managers. But if the scale of production is enlarged

and in one factory we start producing 1000 units of the same commodity, the work can be supervised by one manager.

In this way, in the large scale production, the salary of one manager is saved. So, the cost of production is reduced.

8. Cheap and Easy Loans: A large business can secure credit facilities at cheaper rates, because these firms enjoy credit and reputation in the market due to their fixed assets. Banks and other financial institutions willingly advance loans to these enterprises at a very low rate of interest.

9. Ancillary Industries: With the development of large scale production, there arise many small industries which use its by-products or supply inputs to it. Suppose, when the production of steel is increased, many other auxiliary industries develop. The development of auxiliary industries contributes to the industrialisation of the area and the industry itself.

10. Standard Goods: The production of standardised goods is possible on account of the large-scale production. Only a big motor company can produce standardised motor parts. Besides, it is possible to sell and transport these goods to distant places only by big business houses.

11. Advertisements and Salesmanship: A big concern can afford to spend large amounts of money on advertisement and salesmanship. Ultimately, they do bear fruit. The amount of money spent on advertisement per unit comes to a low figure when production is undertaken on a very large scale.

The salesmen can make a careful study of the individual markets and thus acquire a hold on new markets or strengthen it on the old ones. Thus, a large scale producer has a greater competitive strength.

12. Research: The large scale production is conducive for the development of technology also. With larger amount of capital and financial resources, the large scale firms can afford to spend more on research and experiments which ultimately lead to the discovery of new machines and cheaper techniques of production.

13. Economy of Buying and Selling: A large concern usually buys things in large quantities and therefore, at low rates. It also sells things in large quantities and can secure better terms.

14. Economies of Indivisibility: Many factors of production are not perfectly divisible. For instance, assume that one machine can produce 100 units of a commodity, but we are producing only 50 units by that machine. The machine is indivisible. If the scale of production is increased and we start producing 100 units, per unit cost will be reduced. This is the economy of the indivisible machines.

Disadvantages of Large Scale Production:

The following are the demerits of large scale production:

1. Evils of Factory System: The large scale production is accompanied by all the evils of the factory system like over-crowding, density, pollution, bad morals, etc. Dirty habits of drinking and gambling spread very easily.

2. Danger of Over-Production: The large scale organisation results in over production at times, so demand cannot be properly estimated. At last, prices fall and depression sets in.

3. Less Supervision: A large scale producer cannot pay full attention to every detail in various departments. Costs often rise on account of the dishonesty of workers. Thus, due to inefficient and inadequate supervision, the cost of production goes up.

4. Monopoly: The large scale production results in the localisation of industries. As a result, the bigger fish swallows the smaller ones, and cut-throat competition and monopolies result.

5. Class Struggle: The large scale production gives rise to class struggle, the struggle between the labourers and the capitalists. Their interests cannot go together, as they are very different from each other. As a result, there is a struggle between the two groups.

6. Dependence on Foreign Markets: A large producer has generally to depend on the foreign markets. The foreign markets may be cut off by wars, etc. This makes the business risky.

7. Possibility of War: The large scale production increases the possibilities of wars. Big producers make attempts to sell their goods in the foreign markets and try to capture them by fair and foul means, thereby exposing the world to wars and struggles.

8. Lack of Adaptability: As huge capital is invested in the large scale production, it is very difficult to bring about a change in the scale of production according to the circumstances.

9. Individual Tastes Ignored: The individual tastes and interests stand completely ignored in large scale production. Goods of uniform quality are turned out irrespective of the requirements of the individual customers. Individual tastes are not, therefore, satisfied. This results in the loss of customers to other competitors.

10. Insights and Future Directions : From the above analysis, we can absorb the following insights and future directions in the area of operations research of production and control system.

First, the production control issue regarding the people's livelihood becomes a hot spot. The traditional research in this regard is related to perishable product, automobile product, pharmaceutical product, fashion product, and electronic product, which have short life cycle. Nowadays, such topics might include city logistics, emergency logistics, and agriculture

production control.

Second, new directions on production and control system can be brought about by the development of economy and technology. A typical example is the information technology which leads to the research on e-business and related distribution channel choice. Nowadays, the common usage of RFID, cloud technique, and big data can be important research directions for future study.

Third, the environmental related research will continue to be big issue. With the steady increase in global population and economic scale, resource crisis, ecological damage, environmental pollution, and other issues have drawn universal concern. It has been the consensus of the international community to attain socioeconomic sustainable development through a greener economic pattern and lifestyle. Many countries create a new outlook in industrial and technical competition by increasing investment in the production and control field, formulating and implementing various bills, plans, and strategies, and strengthening the implementation of green economic development strategy. In the future, the range of this topic will not only be just remanufacturing, reverse logistics, and closed-loop production control. Low-carbon issues can be an important research direction.

Finally, multimethodology is an important direction for future study. Traditionally, major research methodologies in operations management can be classified into several categories, such as theoretical modelling, computation and simulations, surveys, cases, event studies, and behavioural experiments. In recent years, there is an emerging trend towards combining multiple research methodologies to explore research problems in production and control system. For example, in addressing the issues of production control coordination, some papers establish the respective models and verify the findings by real-world cases and some papers conduct behavioural experiments with the goal of exploring the real-world relevance of some theoretical models. Moreover, the number of the papers with new applications of the existing methodology, such as cooperative game and behaviour operations, is expected to grow continuously.

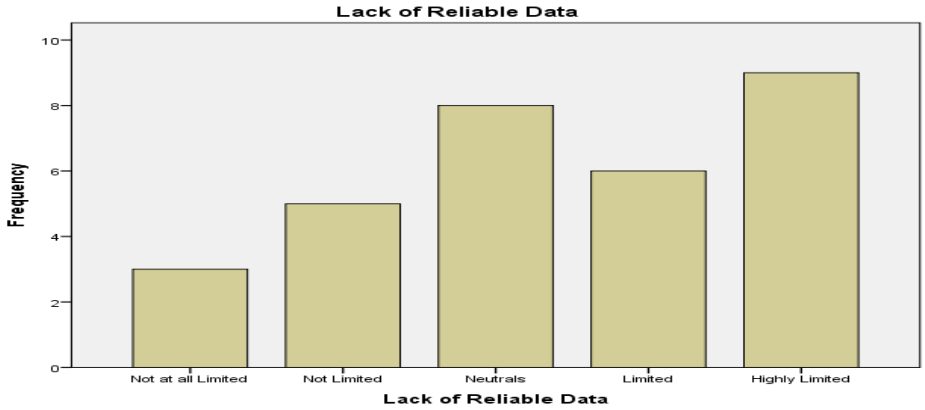
Analysis:

1. Which are key factors that makes limitations for production and

Practices with respect to business performance of your industry?

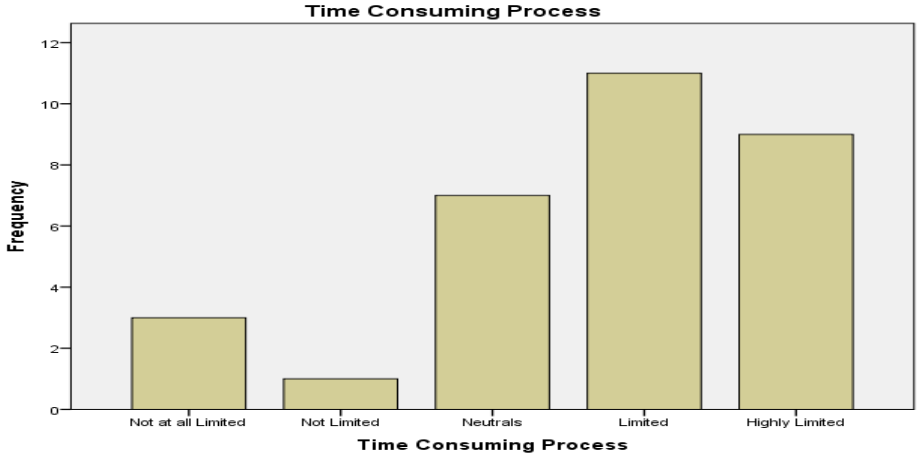
Lack of Reliable Data:

	Frequency	Percentage	Valid Percentage	Cumulative Percentage
Not at all Limited	3	9.7	9.7	9.7
Not Limited	5	16.1	16.1	25.8
Neutrals	8	25.8	25.8	51.6
Limited	6	19.4	19.4	71.0
Highly Limited	9	29.0	29.0	100.0
Total	31	100.0	100.0	



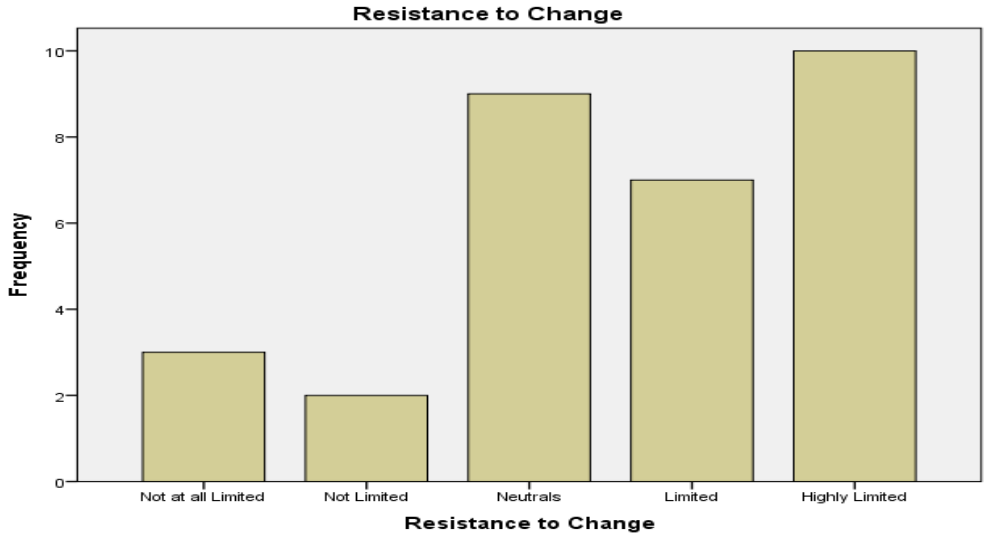
Time Consuming Process

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all Limited	3	9.7	9.7	9.7
	Not Limited	1	3.2	3.2	12.9
	Neutrals	7	22.6	22.6	35.5
	Limited	11	35.5	35.5	71.0
	Highly Limited	9	29.0	29.0	100.0
	Total	31	100.0	100.0	



Resistance to Change

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Not at all Limited	3	9.7	9.7	9.7
	Not Limited	2	6.5	6.5	16.1
	Neutrals	9	29.0	29.0	45.2
	Limited	7	22.6	22.6	67.7
	Highly Limited	10	32.3	32.3	100.0
	Total	31	100.0	100.0	



Acknowledgment :

The author gratefully acknowledges the Production control tries to channelize the production process in such a way that items/goods and services are produced as per the consumer requirements, i.e., of right quality, in right quantity at right/ desired time and cheapest rates.

It is one of the important functions of the enterprise. It ensures the desired output of specified quantity at the prescribed time in the most economical way to meet an approved sales program. Production provides the foundation on which most of the other industrial controls are based.

Conclusion :

All analysis of the collected data from large scale a study on awareness of the present production control practices in industries in pune zone. Industries reflects; largescale industries is also impacted due to COVID -19, which is globally spread. Revenue of industries collectively decreased from year

2019 to 2020, which are indicated by decreasing number of industries in revenue performance. 25% industries having negative revenue performance in 2019 which increase to 37.5% in year 2020, which clearly indicates impact of Covid-19 on IT industries. Number of industries earned profit margin

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Fraud Detection in Banking and Financial Services Using AI (Artificial Intelligence)

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Abstract : Scams in the banking and financial sector have increased with the increase in digital transactions and complex economic ecological systems. Traditional fraud detection systems, which depend on rule -based mechanisms, are often unable to keep up to develop a fraud strategy. Artificial intelligence (AI) has emerged as a transformation solution, machine learning, deep learning and natural language treatment (NLP) improves the detection. This research examines the way of detecting AI-driven fraud, including detection of detection, future analysis and behavioral biometry. This case examines the case studies, where AI has stopped scam transactions and analyzed its role in reducing false positivity. The study also discusses challenges such as concerns about privacy, model lecturers and unfavorable attacks. Conclusions suggest that AI-based scam detection improves accuracy, operational efficiency and ability to prevent fraud. However, continuous progress in AI algorithms and measures to comply with authorities are crucial to its continuous efficiency. This research emphasizes the importance of integrating AI with human expertise to achieve a strong fraud detection structure in banking and financial services.

Keywords: *Fraud detection, artificial intelligence, machine learning, financial services, risk management, cybersecurity, financial fraud prevention, banking security*

Introduction :

The increasing reliance on digital transactions in banking and financial services has brought about a huge upward thrust in fraudulent activities. From identity robbery to cash laundering and credit card fraud, economic establishments face growing challenges in safeguarding

customer belongings and retaining regulatory compliance. This studies explores the position of Artificial Intelligence (AI) in fraud detection, aiming to recognize how AI-driven fashions can beautify accuracy, performance, and security in figuring out fraudulent transactions.

Fraud detection has traditionally trusted rule-primarily based systems and manual monitoring, that are regularly restricted in detecting state-of-the-art fraud styles. AI, mainly through machine gaining knowledge of and deep studying techniques, has revolutionized fraud prevention by means of reading vast amounts of transactional facts in real time and figuring out anomalies that is probably missed by traditional strategies. Many monetary establishments are actually leveraging AI-powered fraud detection structures to reduce financial losses and improve hazard management.

Importance Fraud detection :

Detection of scams for banking and financial services due to increasing sophistication of cyber criminal and economic scams is a significant concern. Artificial Intelligence (AI) has emerged as a game switch in competing by real -time monitoring, future indicating analysis and automatic decision -making. Why is it necessary to find AI-driven fraud here:

1. Prevention of probability of fraud : The AI-MANGO system can analyze the transaction immediately and identify suspicious activities when they occur. This active approach helps prevent fraud before leading to financial loss.

2. Increase in accuracy and efficiency : Traditional rule -based fraud methods often cause false positivity. AI Machine Learning (ML) reduces these errors by using algorithms that continuously improve accuracy over time.

3. Find complex scam pattern : Scammers use sophisticated techniques, such as identity theft, phishing and money laundering. AI can detect hidden correlations and deviations in large datasets that can be excluded from traditional methods.

4. Cost reduction for financial institutions : Scams can cause sufficient financial losses for banks and financial institutions. Detection of AI-driven fraud is minimized to these injuries, which means that the fraudulent activities quickly identify and reduce the cost of manual check.

5. Better customer experience : AI ensures simple banking experience by reducing delays due to unnecessary transaction blocks and methods for detecting traditional scams. This improves self -confidence and satisfaction among customers.

6. Adaptability to develop fraudulent techniques : Scammers are constantly developing their strategy. AI models can learn from new scams and adapt to real time, making them more effective at handling new dangers.

7. Relationship compliance and risk management : Financial institutions should follow strict rules to prevent money laundering and financial offenses. AI helps ensure compliance by automating the risk assessment and reporting suspicious activities.

8. Big data processing and predictive analysis : AI can analyze large amounts of transaction data, user behavior and financial activities to predict potential fraud risk. This allows banks to take preventive measures before future capacity is fraud.

9. Low human intervention and prejudice : Manual scams are about to take detection time and are subjected to human bias. AI automates the process by ensuring objective and computer -driven fraud identity.

10. Strengthening cyber security measures : AI-controlled fraud detection integrates financial institutions with cyber security structure to protect financial institutions from hacking, ransomware and other digital dangers.

Objectives of Study:

1. To explore various AI tools available for fraud detection.
2. To study how AI tools work in fraud detection.
3. To study reviews of the AI tools available fraud detection

Literature Review :

Johora, F. T., Hasan, R., Farabi, S. F., Alam, M. Z., Sarkar, M. I., & Al Mahmud, M. A. (2024, June) In the modern financial sector, management of security and related risks to bank fraud is of the largest importance. In this discovery stands the integration of artificial intelligence (AI) as a lighthouse for the promise, offering versatile solutions that exclude the mechanism of traditional fraud detection. This study is involved in AI Expander applications, identifying scams in the banking sector, depicting its role in advance fasting and navigation, is associated with the way to detect traditional fraud. AI revolutionizes bank fraud and risk management by taking advantage of its rapid analysis functions to detect deviations and flag false activities in real time. Deep learning, especially through trained neural networks on historical scam data, predicts scam transactions with skill and remarkable accuracy in intelligent complex patterns. Natural Language Processing (NLP) improves its customer (KYC) Protocol, which ensures the customer's authenticity by examining text data from different sources.

Alhaddad, M. M. (2018) AI is likely to change the banking industry over the next few years. This is gradually used by banks to analyze and carry out credit applications and examine the huge versions of data. This helps to avoid fraud and enables resource drinks, repetitive

processes and customer operations automated without victims in quality. This study undergoes how the three most promising AI applications can make the banking sector strong and efficient. In particular, we undergo AI fraud detection and prevention, AI -credit management and intelligent document processing. Since most transactions have gone digital, there is a great need to detect bank scams and increase prevention systems. We argued that traditional strategy for identifying bank fraud may be insufficient to fight complex fraud activity. Instead, artificial intelligence algorithm can be very useful. Credit management is a time -consuming and animals when it comes to resources.

Iseal, S., Joseph, O., & Joseph, S. (2025) Integration of artificial intelligence (AI) into financial services has revolutionized risk management and fraud, providing advanced equipment to institutions to improve their operating efficiency and safety. This article applied the transforming effects of AI technologies, including machine learning algorithms, future indicative analysis and natural language treatment when identifying, assessing and reducing the risk in financial transactions. We analyze different AI-operated approaches that enable non-conformity, transaction patterns and real-time monitoring, which facilitates timely intervention to prevent fraud. In addition, we discuss moral implications and regulatory challenges related to AI implementation in the financial sector.

Cook, A. (2023) Integration of artificial intelligence (AI) and Big Data Analytics revolutionize the financial services industry, especially in exposure evaluation and the detection of fraud. Financial institutions benefit from AI's ability to process large amounts of data so that they can make more accurate, date -driven decisions. In risk assessment, AI - Credit assessment, the market risk increases the accuracy of predictions and operational risk reduction, provides the opportunity for more active and individual financial services. Similarly, AI-driven scams are becoming increasingly sophisticated, using machine learning algorithms to recognize and prevent various forms of real-time financial scams.

Research Methodology :

Secondary research process :

This study uses a secondary research method to analyze the role of artificial intelligence (AI) in the discovery of scams in banking and financial services. Secondary research involves collecting, reviewing and synthesizing existing literature, reports and case studies from various reliable sources. The research process includes:

• **Education database:** Scholars' articles, research articles and conference negotiations were obtained from the database such as Google Scholar, IEEE Xplore, Springer and Elsevier.

• **Industry Cord:** Market Survey Report was reviewed from institutions such as Macins', Deloite, PWC and World Economic Forum to understand the trend of AI implementation in detecting fraud.

• **Regulatory structures:** Studies were conducted to assess the challenges of economic regulatory bodies such as Reserve Bank of India (RBI), Financial Action Task Force (FATF) and the European Banking Authority (EBA) to assess the challenges.

• **Case study:** The real implementation of AI-driven fraud detection from banking and fintech companies was analyzed to evaluate efficiency and challenges.

• **News and white papers:** Insight from Matters of Progress, Innovations and fraud Recently, the insight was derived from economic news sources and white papers from AI solution suppliers.

Criteria for Selecting Data and Studies :

To ensure the relevance and reliability of research findings, the following selection criteria were used:

Relevance: Studies were prioritized to focus on AI techniques such as machine learning, deep learning, natural language treatment (NLP) and detection of deviations in the detection of bank fraud.

Reports: Research published over the past five to ten years (2015–2025) was preferred to ensure updated insights into the trends of detecting AI applications and fraud.

Reliability: Only colleagues underwent magazines, reports from reputable financial institutions and publication from reputable regulatory bodies.

Comparative analysis: AI-based scams were studied with traditional rules-based methods to reveal the benefits and boundaries of AI.

Inclusion of case studies: AI was reviewed to provide practical insight into the real world applications to detect fraud from global banks and financial services suppliers.

Research Problem:

To review how AI tools used in Fraud Detection (tools like SAS Fraud Management, FICO Falcon Platform, Threat Metrix, Kount, Simility, Feedzai, Featurespace, Threatcop, Plaid)

Data Analysis (Review of AI Tools used in Fraud Detection)

Detection of fraud in banking and financial services has developed significantly with the integration of advanced technologies. Several devices are designed to compete effectively to compete with scams. With a short story below, how each tool is used to detect fraud, it has been observed:

1. SAS Fraud Management :

- Usage in Fraud Detection: SAS offers fraud and security intelligence solutions that employ anomaly detection techniques. Their software provides fraud data management, alert generation, and case management, enabling organizations to gain a consolidated view of fraud risks.
- History: SAS Institute, founded in 1976, has a long history of providing analytics solutions. Their fraud management tools have evolved to incorporate advanced analytics and machine learning to combat sophisticated fraud schemes.

2. FICO Falcon Platform :

- Usage in Fraud Detection: The FICO Falcon Platform utilizes machine learning models and adaptive analytics to detect and prevent fraud in real-time across multiple payment channels. It helps financial institutions protect customers and manage fraud effectively.
- History: FICO, established in 1956, introduced the Falcon Platform to address the growing need for real-time fraud detection. It has become one of the most widely used fraud detection systems globally.

3. ThreatMetrix :

- Usage in Fraud Detection: ThreatMetrix provides real-time authentication, device identification, and digital identity intelligence. It helps organizations recognize legitimate customers and detect fraudulent activities by analyzing device and behavioral data.
- History: Founded in 2005, ThreatMetrix has become a key player in digital identity verification and fraud prevention, offering solutions that leverage a global network to provide insights into online transactions and identities.

4. Kount :

- Use in the detection of fraud: Kount uses machine learning and AI to offer fraudulent prevention solutions. This provides real -time analysis and scoring to detect and prevent fraud activities in different channels.
- History: Kount was created in 2007, and has focused on offering AI-driven fraudulent prevention solutions, which help companies reduce the loss of the return and fraud by increasing the customer experience.

5. Simility :

- Use in the detection of fraud: Simality provides a platform for the prevention of fraud that combines machine learning with human insight. This provides real -time fraud detection and adaptive risk management solutions that fit different industries.
- History: Created in 2014, similar acquired by PayPal in 2018. The purpose of the acquisition was to integrate the advanced Synown risk management solutions to detect and increase the potential of Paple to detect false activities.

6. Feedzai :

- Use in the discovery of fraud: Feedzais AI-controlled platform detects and prevents fraud, money laundering and other financial offenses in all channels. It analyzes large amounts of data in real time to identify deviations and potential threats.
- History: Feedzai was created in 2011 and has become an important supplier of fast AI-based scam detection solutions, which are with large financial institutions to secure transactions and protect customers.

7. Featurespace :

- Use to detect fraud: FREESPACE uses adaptive behavioral analysis to detect deviations in individual behavior, enabling the identification of fraudulent activities. The Arch platform provides real-time fraud detection and prevention solutions.
- History: Freemspace was created in 2008, and has pioneers for the use of adaptive behavioral analysis, and provided solutions to organizations in various fields effectively cheating and economic crime.

8. Threatcop :

Thrixcop is a tool for cyber security simulator and awareness that launches dummy cyber horses on employees with consciousness modules and GameIfied assessments. It simulates and provides adapted consciousness based on top 6 attack vectors such as fishing, ransomware, trusting, smoothing, cyber fraud and removable media. It compares the previous levels and to the employees after cyber security and provides a comprehensive report on individual user awareness such as 'Employee Pomegranates score (EVS)'. Consciousness video, advice, newspapers and Gameified Quiz have been adapted to EVS point, thus securing cyber flexibility. This is a complete suite for your employees' awareness of cyber security.

Threatcop Reviews :

Pros: The tool provides a complete solution from checking the vulnerability score to follow-up training. We can schedule the campaign daily, weekly, or monthly as per our

organization's needs. Also, these campaigns can be launched on every employee, regardless of whether they are working from the office or working remotely.

Cons: I like everything about it so far. It has proved to be quite helpful for us in strengthening our employees.

Overall: With ThreatCop, we can simulate six cyber attack vectors and also check each employee's vulnerability score. The tool lets us create a group of users, which is really helpful when launching campaigns specifically designed for a certain group.

9. Plaid :

Plaid is a global computer network that trusts millions of people to live a healthy economic life. The convenience of a more inclusive, competitive and mutually advantageous economic system is to simplify our ambition payments, revolutionize lending and lead a fight against fraud.

Plad collaborates with over 8,000 companies, with many of Wittec, many of Fintech, Fortune 500, and many largest banks such as Venmo and Sophie, and how they manage their money to strengthen people with greater choices and control to many largest banks. The headquarters of San Francisco, the checkered network extends to more than 12,000 institutions in the United States, Canada, the United Kingdom and Europe.

Plaid review :

Pros: Good at what it does, fairly easy to set up and offers a lot of flexible customization features for bringing people into your financial apps.

Cons: Not a lot to hate about Plaid, I think the pricing can start to creep up if you have lots of users connecting their banks.

Overall: I think Plaid is a much better platform than other alternatives out there, like a Yodlee, it has much better design and just really gets the job done.

10. SEON :

Zion's mission is to create a free world -free world by first stopping scams and speeding up on customers' journey. With confidence in more than 5,000 companies, Seon has reviewed billions of transactions, which prevents more than € 160 billion in fraudulent activities. Our rapid integration, and 30 days of free trials, lets companies try to try SEON with low risk and high prices. Seon offers a wide end-to-and-fraud prevention solution, including anti-mani-white laundering (AML). Our unique approach combines social characters with deep digital footprints, and utilizes a completely understandable machine to identify the dangers of new fraud. Sifed's Rising 100, Deloites Technology Fast 50, Emerging Unicorn of Crunchbase

and G2's fastest growing software in 2022, as recipients of more gratitude have collected $ 94 million in series B -financing by April 2022. Driver globally from Austin, London, Buddon.

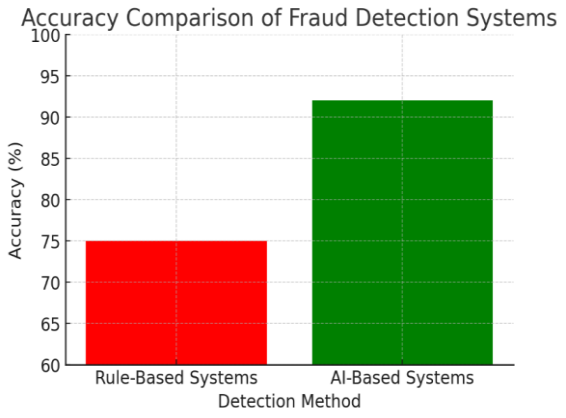
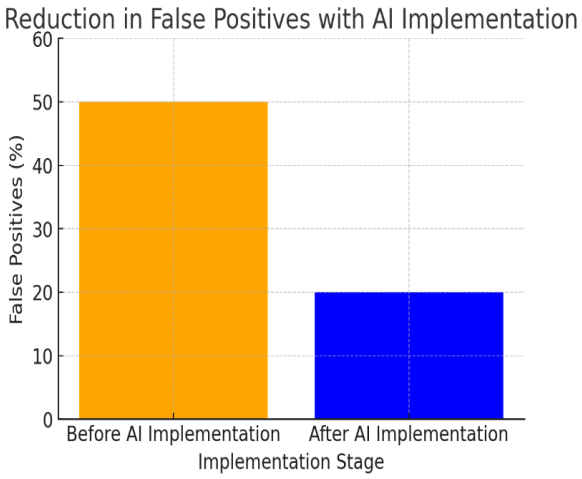
SEON Reviews

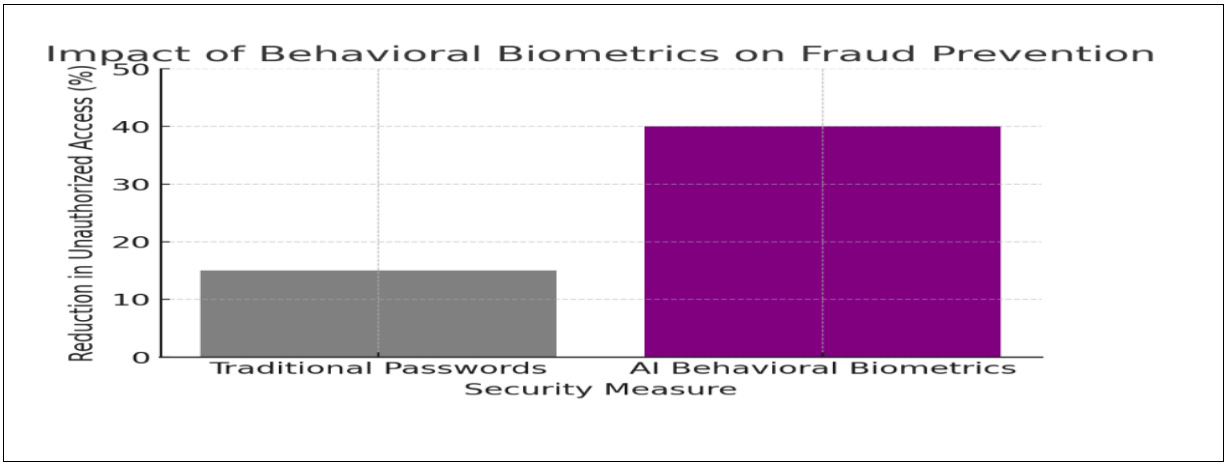
Pros: SEON's advanced behavioral analytics, seamless integration, and intuitive interface make it a top choice for fraud prevention.

Cons: Limited customization options and occasional performance issues during peak usage.

Overall: SEON offers robust fraud prevention capabilities with user-friendly features, making it a valuable asset for organizations combating online fraud.

These units have improved financial institutions to detect and prevent fraud, benefit from advanced technologies such as AI and machine learning to stay in front of quickly sophisticated fraudulent activities.

1) Here is a bar chart comparing the accuracy of rule-based and AI-based fraud detection systems. AI-based systems show significantly higher accuracy.	2) This bar chart illustrates the reduction in false positives before and after AI implementation in fraud detection systems. AI significantly decreases false alarms, improving efficiency.
	
3) This bar chart highlights how AI-driven behavioural biometrics significantly reduce unauthorized access compared to traditional password-based security.	



Fraud Detection System	Estimated Percentage (%)	Fraud Detection System	Estimated Percentage (%)
SAS Fraud Management	~12%	Feedzai	~15%
FICO Falcon Platform	~14%	Featurespace	~10%
ThreatMetrix	~10%	Threatcop	~11%
Kount	~8%	SEON	~6%
Simility	~9%	Plaid	~5%

The table presents the approximate percentage of the use of different fraud detection systems.

Big comments include:

• Feedzai is the most widely used system with about 15% of use.

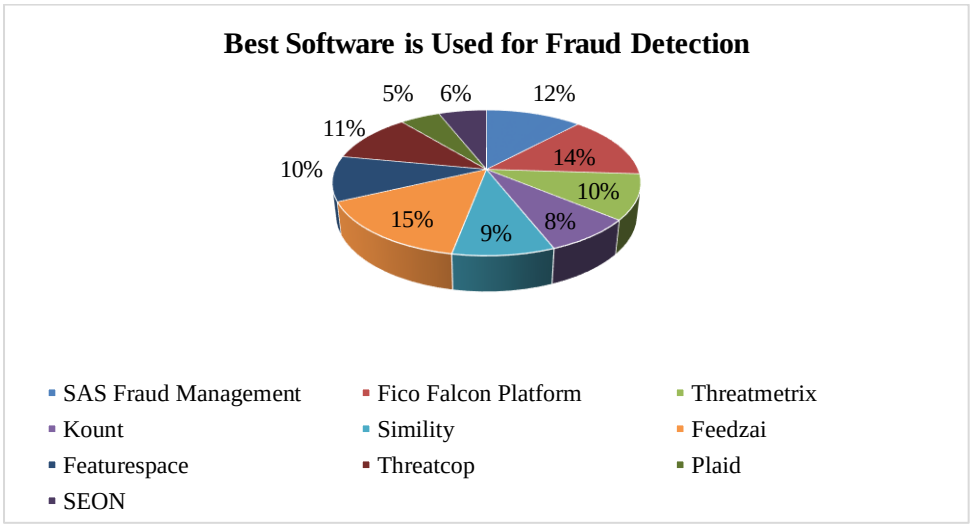
• The Fico Falcon platform is the second most widely used at about 14%.

• SAS fraud administration is used for about 12% time.

• The lowest use of blankets is about 5%.

• The remaining systems (threatening matrix, counting, synown, functional pace, tretot and seon) are used between approx. 6% and 11%.

It is important to note that this is estimated percentage, and real use can vary.



Findings and Discussions :

Major Insight by Research :

- The analysis of existing studies and industry reports shows many important insights on the detection of AI-controlled fraud in banking and financial services:
- AI improves the accuracy of the detection of fraud: Machine learning (ML) and deep learning (DL) algorithms perform better in traditional statutory methods for detecting scam transactions by identifying complex patterns and anomalies.
- Reduced false positive: AI models improve the efficiency of the detection of fraud by reducing false positively, reducing the decline in unnecessary transactions and increasing the customer experience.
- Prevention of real-time fraud: AI-controlled system can analyze large amounts of real-time transaction data, allowing active fraud prevention instead of reactive detection.
- Behavior improves biometrics Safety: Advanced AI technology, such as the detection of behavioral biometrics and deviations, user behavior, ethics -synamics and transactions to strengthen fraud prevention by analyzing habits with Kestrokke dynamics and transactions.
- Challenges in AI implementation: Despite the benefits, data fails to detect AI-based scams with challenges, including privacy problems, regulatory compliance, unfavorable attacks and AI-declaration "Black Box" nature.

The Analysis and Interpretation of findings :

- **AI's efficiency in detecting fraud :** Reviewed studies indicate that the AI-driven fraud detection systems show more than 90% accuracy in identifying suspicious activities, which is much higher than traditional rules-based systems, which are often struggling to develop a strategy for fraud.
- **Lack of false positive and operational efficiency :** According to reports from Deloite and McKinse, the detection of AI-controlled fraud is reduced false positivity by about 30-50%. This improvement increases the efficiency of the scams, so that they can focus on high risk cases instead of transmitted through flagged but valid transactions.
- **Detection :** Unlike methods of detecting traditional scams that rely on batch treatment, AI -Systems use real -time analysis, and identifies and blocks scam transactions immediately. This real -time method is important to prevent financial loss and protect customer accounts.
- Behavioral biometry Banks that use behavioral biometrics - which analyze writing

speeds, mouse movements and login patterns - reported a 40% reduction in unauthorized access cases, strengthening AIS role in increasing safety.

Regulatory and compliance challenges :

Despite the benefits of AI, financial institutions should address regulatory concerns related to the Privacy Act on data (eg GDPR, RBI guidelines). The AI models are also facing investigations due to lack of transparency, which makes compliance with economic rules a significant challenge.

Conclusion :

By using AI using AI, the study highlights the detection of scams in banking and financial services the transforming role of machine learning, deep learning and behavioral biometry when it comes to fighting economic fraud. Conclusions indicate that the AI-driven scam detection system improves significant accuracy, reduces false positivity and enables the prevention of real-time scams. Unlike traditional rule -based models, AI can analyze gigantic datasets, identify hidden fraudulent patterns and fit new dangers, making it an important tool for modern financial institutions.

However, AI implementation data comes with challenges such as privacy problems, regulatory compliance, model transparency and exposure to the risk of unfavorable attacks. Financial institutions should be balanced between technological progress and moral ideas to ensure responsible AI distribution. In addition, the integration of AI with human expertise can create a strong fraud detection structure that improves safety by maintaining trust between customers and regulatory bodies.

Recommendations for future research and applications :

Alcoholic to operate AI (XAI) to explain: To develop more explanatory AI models to increase transparency and regulatory compliance.

Integration of AI with a blockchain: To explore blockchain techniques to complement AI in fraud detection, ensure safe and tamper-proof financial transactions.

Increase Privacy measures for data: Application of AI-operated encryption and privacy protection techniques to reduce data security problems.

Banding AI-driven bank cooperation: Financial institutions encourage financial institutions to strengthen the AI model and share anonymous scam data to improve fraud detection.

Actions that deal with side effects: Developing AI models that are flexible to manipulate the scammers and continuously update the algorithms to fight new dangers.

In conclusion, AI has revolutionized fraud in banking and financial services, which provides increased security and operational efficiency. However, continuous research, technological

progress and regulatory cooperation are required to maximize the AI opportunity, and address the limitations.

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Artificial Intelligence (AI) Tools used in Fundamental Analysis

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Abstract : In this new era of investment, investors want to explore investment decisions using AI tools. This study tries to explore use of ChatGPT and Gemini AI tools for evaluating company's financial performance from its Profit & Loss Account, Balance Sheet, and Cash Flow Statement. It reviews important financial factors like sales growth, profit efficiency, debt management, expected internal rate of return and cash flow. The findings show that investors can use these tools for reading financial data. These tools can help investors to study whether the company is good at making money and maintaining profit margins or not. Based on those financial risks like high debt, change in earnings per share (EPS), and change in cash flow can be observed while making investment decisions, and these tools may help to estimate the approximate Internal Rate of Return (IRR) in next 5 years.

Keywords: *Financial statement, Artificial Intelligence, ChatGPT, Gemini, Internal Rate of Return (IRR), Earning Per Share (EPS).*

Introduction :

In recent years, artificial intelligence (AI) tools like ChatGPT and Gemini have changed how fundamental analysis is done in finance. Investors and analysts need to make smart decisions based on large amounts of data, but processing and understanding this information has become more complicated. Traditional analysis methods often lack speed and accuracy, which can lead to poor investment choices.

The main issue is the huge amount of financial data and the need for quick insights to help

with investment decisions. Analysts receive many reports, market trends, and economic indicators, making it hard to find useful information.

By using natural language processing these AI tools can help simplify data analysis, spot patterns, and provide predictive insights. This research will look into how effective ChatGPT and Gemini are in solving the challenges of fundamental analysis and their influence on investment decision-making.

Objectives of Study :

1. To study the use of AI tools to analyse financial statement of the respective company.
2. To identify expected Internal Rate of Return of the respective company.
3. To assess investment risks to enhance portfolio performance.

Significance :

AI tools are important in fundamental analysis because they help improve the accuracy and speed of financial evaluations. These tools use advanced algorithms and machine learning to look at large amounts of data, such as financial statements and market trends. By automating data collection, AI helps analysts find patterns that might be missed with traditional methods. They also allow for real-time analysis, helping investors make better decisions with the latest information. Overall, AI provides valuable insights, reduces mistakes, and improves investment strategies, making it essential in today's fast-moving financial world.

Literature Review :

Kulshrestha, N., & Srivastava, V. K. (2020, June): - In his examination, he says that on Wall Street is that "the crowd is right in trends and wrong at the ends." Many investors do not understand the math, science, and psychology behind Technical Analysis, Fundamental Analysis, and Artificial Intelligence in financial markets. This paper uses Technical Analysis (specifically the Relative Strength Index), Fundamental Analysis, and Artificial Intelligence to improve portfolio performance, focusing on fifty selected stocks like Reliance Industry Ltd, ICICI Bank, HDFC Bank, Axis Bank, and TCS. The goal is to assess how effective the Relative Strength Index is in the Indian stock market. We aim to create a trading system and a back testing strategy to enhance the portfolio. The analysis involves back testing optimized indicators for the chosen stocks from January 2013 to January 2020, using Amibroker software to evaluate the portfolio's efficiency.

Dakalbab, F., Talib, M. A., Nassir, Q., & Ishak, T. (2024): -Artificial Intelligence (AI) is increasingly being used in financial markets due to advancements in technology. This research paper reviews 143 studies on AI techniques in financial trading. It looks at various aspects, including the types of financial markets and assets, the types of trading analysis used,

and the AI techniques applied. The articles reviewed were published between 2015 and 2023 and address four main research questions. We found that 8 financial markets are commonly used for creating predictive models, with technical analysis being more popular than fundamental analysis. Additionally, 16% of the studies fully automate trading. We identified 40 different AI techniques, with deep learning being the most common. Overall, using AI for financial predictions is a promising area, and many machine learning models have already been developed. We offer recommendations for future research.

Chopra, R., & Sharma, G. D. (2021): -The stock market often experiences big changes and is influenced by various factors. Artificial intelligence (AI) can help identify these changes, leading to better predictions. This paper looks at 148 studies that use neural and hybrid-neuro methods to forecast stock markets, organized into 43 themes using NVivo 12 software. We categorize the articles into two main groups: study characteristics and model characteristics. Study characteristics include the stock market analysed, the data used, and the type of study. Model characteristics cover data preparation, AI methods, training methods, and performance measures. Our results show that AI can effectively analyze stock market activities. We end with suggestions for future research for financial analysts and AI scholars.

Devita, H., Umaryadi, M. E. W., & Buana, P. S. (2025): -In her study looks at how well fundamental and technical analysis can predict stock movements and what that means for investors. Fundamental analysis examines a company's finances and overall performance to find its true value, while technical analysis looks at past prices and trading volumes to spot market trends. Each method has its pros and cons. Fundamental analysis is better for long-term investments because it gives a detailed view of a company's growth potential. In contrast, technical analysis is more helpful for short- and medium-term decisions since it can identify trading signals based on recent market activity. The study concludes that using both methods together can create a stronger investment strategy, improving portfolio performance and reducing risk in different market situations.

Amini, A., Rahnama, G., & Alinezhad, A. (2015): - The stock selection problem is a key challenge in investing, primarily addressed by looking at financial ratios. However, due to the stock market's complexity and unpredictability, straightforward investment rules based on fundamental analysis are hard to find. There are two main methods for predicting stock behaviour fundamental analysis, which examines economic factors affecting supply and demand, and technical analysis, which studies past price and trading volume data using graphs and indicators to forecast future price changes. This paper proposes a model for choosing the right stock portfolio. It uses rankings of financial industries and companies,

determined by the PROMETHEE decision-making method. Technical analysis is employed to identify the best times to buy and sell top stocks. A survey was conducted to identify key criteria for evaluating industries and companies.

Csesznik, Z., Gáspár, S., Thalmeiner, G., & Zéman, Z. (2021): -In the last ten years, new methods have been created to improve equity portfolios. These methods often rely on complex math or financial models, while less focus has been on companies' internal data. Recently, external data has gained importance. However, for long-term investments, relying too much on external data may not be the best way to build a portfolio. This paper shows that complex models based on simpler fundamental indicators can also be useful for making investment choices. Our findings confirm that basic indicators can lead to better returns. We analyzed financial reporting data using various indicators and compared it to the S&P500 index. Our analysis shows that using basic indicators can be more effective than following a market index. By the end of our study, the portfolio based on five key financial indicators outperformed the benchmark by 1.68%. This indicates that even simpler models can be effective in creating an equity portfolio.

Research Methodology :

The descriptive and explorative research method is used by the researchers for analysing companies using AI tools.

Data collection: This research study is based on the secondary data for which various companies website, software's, annual reports and various articles are used in this research study.

Sample size: The structured approach to analyse and interpret data of 4 randomly selected companies were used and analysed by using 2 AI tools

1) Tata Steel Ltd.
2) Reliance Inustries Ltd.
3) Bajaj Finance.
4) Asian Paints Ltd.

To explore AI tools like ChatGPT and Gemini AI for the fundamentals analysis, first set clear goals and collect important financial data. Use ChatGPT for organizing data and getting insights and use Gemini AI for number analysis and scenario evaluations. Lastly, put the results into a clear report and keep improving the process based on expert advice and market updates.

Data Analysis :

Here is the difference between the analysis of ChatGPT and Gemini AI.

Table No. 1. Financial Analysis done through ChatGPT & Gemini about Tata Steel Ltd.

Particular	ChatGPT	Gemini
Profit/loss A/c	Fluctuation in revenue	Consistent increase in sales
Balance sheet	The company base asset has expanded due to healthy mix of investment and capital work in progress. Borrowing was high, but it shows it is stabilized, growth in reserve was strong retain earning.	The company hold significant fixed assets showing long term investments. High borrowing indicates leverage dependency but reserve has increased.
Cash flow	It fluctuates due to debt repayment and impacting liquidity.	Debt repayment and financing impact net cash flow, needing strategic planning.
Internal Rate of Return	The IRR for the next 5 years is approximately 19.46%.	IRR data not presented by this tool.

Table No. 2. Financial Analysis done through ChatGPT & Gemini about RELIANCE INDUSTRIES Ltd.

Particular	ChatGPT	Gemini
Profit/loss A/c	Reliance industries has shown a strong growth rate from 3years.	Reliance industries have a growth rate from 7 to 3 years are very high but the level of growth has not been in consistent.

Balance sheet	Reliance Industries is expanding its operations, as indicated by the increase in reserves and borrowings, alongside growing investments and assets. Despite the rising debt, the company demonstrates efficient capital use with a Return on Equity (ROE) of 9% and a Return on Capital Employed (ROCE) of 11%.	The balance sheet reflects a growing company with increasing assets and equity, but the rising debt requires careful examination to assess financial risk. Additionally, the fluctuating inventory turnover suggests potential challenges in inventory management.
Cash flow	Reliance Industries Ltd. Demonstrates strong operating cash flow growth of ₹1,58,788 Cr in FY24, indicating solid core performance. However, high investing outflows point to aggressive capital expenditures, and fluctuating financing cash flow suggests changing debt and equity strategies. Overall, recent positive net cash flow indicates effective liquidity management.	This cash flow statement reveals fluctuating cash from operations, indicating potential volatility in core business performance. Significant cash outflows from investing activities suggest ongoing expansion or acquisitions. Financing activities show a mixed pattern, with periods of both raising and repaying capital, which needs further context for interpretation.
Internal Rate of Return	According to this, the IRR for the next 5 years is approximately 115.35%	According this, the tool cannot provide the IRR.

Table No. 3. Financial Analysis done through ChatGPT & Gemini about BAJAJ FINANCE.

Particular	ChatGPT	Gemini
Profit/loss A/c	Bajaj Finance's profit and loss statement shows strong revenue and profit growth over the years,	Bajaj Finance shows consistent revenue growth over the years, but profitability fluctuates, suggesting potential cost management challenges.

Balance sheet	Bajaj Finance's balance sheet reflects strong growth, with total assets increasing significantly from ₹32,779 Cr in Mar-15 to ₹3,75,741 Cr in Mar-24, driven by rising borrowings and reserves. The company maintains healthy return ratios (ROE ~19%, ROCE ~12%), indicating efficient capital utilization despite increasing liabilities.	Bajaj Finance's balance sheet shows consistent growth in total assets and liabilities over the years, indicating business expansion. However, the fluctuating return on equity and capital employed suggests potential inefficiencies in asset utilization and profitability management.
Cash flow	Bajaj Finance's cash flow statement indicates heavy cash outflows from operating activities. Likely due to increased lending. However, strong financing inflows (₹82,415 Cr in Mar-24) ensure positive net cash flow.	Bajaj Finance shows fluctuating cash flow from operations, with significant negative trends in recent years, indicating potential challenges in managing working capital or profitability.
Internal Rate of Return	The estimated IRR (Internal Rate of Return) based on past cash flows is approximately 50.85%.	If Bajaj Finance implements effective strategies to significantly improve its operating cash flow and generate positive cash from operations, the IRR could be higher, indicating a more attractive investment.

Table No. 4. Financial Analysis done through ChatGPT & Gemini about ASIAN PAINTS.

Particular	ChatGPT	Gemini
Profit/loss A/c	The growth rate of the Asian paints is growing steadily from the previous year.	Asian paints experience the fluctuations in revenue due to the economic condition.
Balance sheet	The balance sheet of Asian Paints Ltd shows a consistent increase in reserves and total assets, indicating strong financial growth.	This balance sheet indicates consistent growth in equity and assets, suggesting a healthy expansion trajectory for Asian Paints.

Cash flow	Asian Paints Ltd has improved cash from operations, but rising outflows in investing and financing indicate ongoing expansion and potential debt repayments. Nonetheless, the company retains a positive net cash flow, indicating stable liquidity.	Asian Paints demonstrates a positive trend in operating cash flow, reflecting strong business performance, but shows volatility in investing and financing activities, indicating potential risks. Further analysis is required to evaluate long-term sustainability.
Internal Rate of Return	The IRR calculation is encountering issues due to the volatility and fluctuations in cash flows.	It's not possible to accurately predict the IRR for the next five years based solely on this historical cash flow data. IRR is heavily influenced by future cash flows, which are dependent on numerous unpredictable factors.

Findings :

1) **Tata Steel Ltd: -** ChatGPT provides quantitative estimates (IRR) and deeper financial insights, whereas Gemini gives a more general and qualitative view without specific calculations.
2) **Reliance Industries Ltd: -** ChatGPT provides precise figures (IRR, cash flow, ROE, ROCE) and deeper financial insights, while Gemini gives a more general assessment, focusing on risks and qualitative factors without specific calculations.
3) **Bajaj Finance: -** ChatGPT gives clear numerical details, like asset growth from ₹32,779 Cr to ₹3,75,741 Cr, financing inflows of ₹82,415 Cr in Mar-24, and return ratios (ROE ~19%, ROCE ~12%). It also calculates the IRR at 50.85%, providing a specific estimate for investment returns. In contrast, Gemini focuses on general trends without exact numbers and does not calculate IRR, but suggests that better cash flow could make investments more appealing. Overall, ChatGPT offers specific financial data, while Gemini gives a broader, less detailed view.

4) **Asian paints Ltd:** - ChatGPT offers a detailed financial review with clear numbers, showing consistent growth for Asian Paints. In contrast, Gemini focuses on qualitative insights. For cash flow, ChatGPT notes a positive net cash flow despite increasing outflows, while Gemini points out volatility and risks without clear conclusions. When it comes to IRR, ChatGPT mentions challenges in calculations due to cash flow changes, whereas Gemini says predicting IRR is impossible without future data. Overall, ChatGPT uses a data-focused approach, while Gemini is more cautious and qualitative, lacking numerical estimates.

Conclusion :

AI tools like ChatGPT and Gemini are changing the way financial analysis is done by making it faster and more accurate. This study compared their analysis of companies like Tata Steel, Reliance Industries, Bajaj Finance, and Asian Paints. The findings show that these tools help investors understand revenue growth, profits, debt levels, and stock performance. While some companies have strong financial stability, others face risks like high debt or fluctuating earnings. AI tools make it easier to track market trends and investment opportunities, helping investors make better decisions. Using both ChatGPT and Gemini together can give a more complete and reliable financial analysis.

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Website Link

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6. *https://www.asianpaints.com/*

Impulsive and Compulsive Buying Behavior in Retail: A Study of Consumer Trends in the Pune Region

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Abstract : This research paper explores impulsive and compulsive buying behavior in the retail sector, focusing on consumer trends in the Pune region. Impulsive buying occurs when consumers make spontaneous, unplanned purchases driven by emotions or environmental cues. In contrast, compulsive buying involves a persistent, uncontrollable urge to shop, often resulting in financial strain and psychological distress. These behaviors influence consumer spending habits, brand loyalty, and market dynamics. This study examines the psychological, social, and economic factors that drive impulsive and compulsive buying behavior. Psychological factors include emotional triggers, self-control, and personality traits. Social influences involve peer pressure, societal expectations, and digital marketing strategies. Economic factors, such as disposable income, promotional offers, and seasonal trends, also shape consumer decisions.

This research uses a mixed-method approach, combining quantitative surveys to gather statistical insights on consumer purchasing habits with qualitative interviews to explore individual motivations and experiences. This comprehensive method provides a well-rounded analysis of consumer behavior in Pune's retail market. This study's findings will offer valuable insights into consumer buying patterns and their impact on retailers. Businesses can use these insights to adjust marketing strategies, improve store layouts, and refine promotional tactics. This research also contributes to consumer psychology and retail management, providing practical recommendations to boost customer engagement and increase sales.

Keywords*: Impulsive Buying, Compulsive Buying, Consumer Behavior, Retail Market, Marketing Strategies*

Introduction :

Consumer purchasing behavior directly affects retail sales, brand loyalty, and market trends. Therefore, retailers and marketers continually refine their strategies to understand and react to consumer purchase decisions. Specifically, impulsive and compulsive purchases, driven by psychological, social, and economic factors, generate significant consequences. These behaviors, shaped by individual traits and broader cultural and market forces, demand close examination in consumer research. Consumers make impulsive purchases when emotions, external stimuli, or marketing strategies spark spontaneous buying decisions. Factors such as discounts, visually appealing displays, and the desire for immediate satisfaction often influence these choices.. Conversely, compulsive buying manifests as a persistent, uncontrollable urge to shop, frequently leading to financial hardship, guilt, and lasting psychological consequences. While impulsive buying typically occurs sporadically and depends on the situation, compulsive buying is repetitive and habitual, stemming from underlying emotional and cognitive patterns. These behaviors significantly influence consumer spending, business revenue, and retail strategies, thus requiring thorough investigation. This study investigates the factors that stimulate impulsive and compulsive purchasing among Pune consumers. Specifically, it determines how psychological influences, including emotional triggers, self-control, and personality characteristics, guide buying choices. Additionally, the researchers analyzed how social pressures, such as peer influence, societal norms, and digital marketing techniques, mold consumer habits. Moreover, they evaluated how economic forces, like disposable income, special promotions, and seasonal shifts, affect shopping patterns. Pune’s quickly developing urban landscape and its resulting dynamic retail market offer an excellent opportunity to observe these interconnected dynamics.

The researchers used a mixed-methods design to examine these behaviors in depth. They conducted quantitative surveys to gather statistical data and qualitative interviews to explore consumers' underlying motives and experiences. This comprehensive approach offers a detailed and holistic view of consumer purchasing trends in Pune’s retail market. By integrating data-driven insights with real-life experiences, the study aims to provide a more accurate representation of consumer behavior.

This study’s findings will help merchants, marketers, and policymakers to make informed decisions. By analyzing impulsive and compulsive buying habits, businesses can optimize marketing strategies, store layouts, and promotional tactics to match consumer behavior better. Additionally, the study provides practical insights to enhance customer engagement,

strengthen brand positioning, and drive long-term sales growth, contributing to consumer psychology and retail management. By highlighting the opportunities and challenges of these behaviors, the study aims to bridge consumer needs with effective retail strategies.

The objective of the Study:

1. To examine impulsive and compulsive buying behavior among consumers in Pune's retail sector.
2. To identify the psychological, social, and economic factors influencing impulsive and compulsive buying.
3. To examine the impact of emotional triggers, self-control, personality traits, peer pressure, societal expectations, and digital marketing on consumer purchasing decisions.
4. To assess the role of economic factors such as disposable income, promotional offers, and seasonal trends in shaping consumer behavior.
5. To Offer insights and recommendations for retailers to enhance marketing strategies, improve store layouts, and optimize promotional tactics to drive consumer engagement and sales.

Scope of the Study:

This study explores consumer impulsive and compulsive buying behaviors in Pune's retail stores.

1. The study covers psychological aspects, including emotional and cognitive influences on consumer decision-making.
2. Social elements that affect consumer behavior include peer pressure, cultural standards, and developments in digital marketing.
3. Economic factors, such as income levels, sales, and the impact of the seasons on consumer behavior.
4. A mixed-method technique that uses both qualitative interviews and quantitative surveys to record both individual experiences and statistical trends.
5. Useful implications for legislators, marketers, and retailers to improve customer experience, improve marketing tactics, and lessen the harmful effects of compulsive buying.

Literature Review :

Dr. Prashant Ravindra Kumar Pandya1, Dr. Kerav Pandya (2022) found that respondents frequently consider shopping be a unique activity, even in times of emotional difficulty, and link it to happiness, self-esteem, and mood enhancement. Their compulsive behavior influences their purchasing choices; they react to sales, buy extraneous items, pursue luxury goods, and occasionally experience regret or shame after going over budget. Even if they do not have time or money, people can still improve their image and relieve tension by shopping. Despite concerns about their purchasing habits, many continue spending, experiencing anxiety or rage, yet finding self-esteem boosts in high-end products. Some people feel happy when they shop freely because it satisfies their underlying urge to stand apart. Baker Qureshi, P. et al. (2019) found a strong correlation between impulsive purchasing and social network marketing. Since consumers seek instant gratification, marketers can refine their social media strategies to stimulate impulsive buying. Reviews, recommendations, and decision fatigue play a crucial role in electronic word-of-mouth, significantly influencing unplanned purchases.

Parmar Vishnu and Ahmed Rizwan Raheem (2013) stated that consumer impulse buying behavior for FMCG (products) is favorable in Pakistan. Consumers are more likely to buy impulsively when they see free products and price discounts offered by a store. The income level and visual merchandising have a high and significant influence on consumers' impulse buying for FMCG's (products) in Larkana Pakistan, especially, a well decorated, pleasant, and calm store environment along with colorful surroundings not just motivating the consumers to buy unintentionally but also build excitement inside the consumer's minds. Window displays and visual merchandising have an important role-play for consumer's impulse buying. Consumers can be attracted to a store for purchase by setting up well-designed window displays and by insertion up a proper placement of products, packaging, and displays of products along with a better presentation of products and store.

Saman Attiq(2013) Stated that Customers typically see buying as a routine activity; frequent buyers are not particularly excited and frequently read promotions, which can occasionally be connected to a family history of obsessive illnesses. But for others, shopping is an exhilarating activity motivated by an insatiable need. Since motivation comes from both internal and external impulses, social factors like values and group conformity have an impact on purchasing behavior in Pakistan's collectivist culture. Stronger feelings and greater involvement in shopping are correlated with greater determination. Although compulsive shopping, a goal-oriented habit, provides momentary solace from stress and worry, it

frequently has detrimental effects like debt, melancholy, frustration, interpersonal problems, and low self-esteem.

Baker Qureshi, P. et al. (2019) found a strong correlation between impulsive purchasing and social network marketing. Since consumers seek instant gratification, marketers can refine their social media strategies to stimulate impulsive buying. Reviews, recommendations, and decision fatigue play a crucial role in electronic word-of-mouth, significantly affecting unplanned purchases. The desire for pleasure fuels impulsive purchases, and marketers tap into this by emphasizing product scarcity and providing flexible payment options. Additionally, trust significantly influences buying decisions, as consumers are more likely to purchase from brands they perceive as reliable. Social media reinforces impulsive purchasing throughout the customer journey—from awareness to advocacy—by leveraging peer influence and personalized advertisements. Online retailers should actively use social networking platforms to boost impulsive buying.

Shaker, K., Mufti, M. N., & Zahid, M. Z. (2017) found that salesperson behavior, store displays, and promotional activities significantly influence impulsive purchases. Attractive store layouts, engaging marketing strategies, and knowledgeable staff enhance customer decision-making. The study also revealed a positive correlation between education level and impulsive buying. Additionally, courteous salespeople encourage spontaneous purchases. Social media is a powerful marketing tool, particularly for business owners in Faisalabad, who should utilize it to enhance their product visibility. To gain a competitive edge, businesses must adopt distinctive product displays, choose prime locations, and incorporate visually appealing decorations. Targeting impulse buyers in high-income areas proves most effective. Offering discounts and buy-one-get-one-free promotions successfully drive impulsive purchases, while product variety increases customer interest and engagement.

Kunwar, P., & Misra, H. (2018). The study found that store design, buying motivators, ambiance, and the availability of branded-quality products were the most important store attribute aspects that influence consumers' purchasing decisions. According to the Visual Merchandise component analysis, factors like advertising themes, impulsive buying, alluring offers, and ambiance had the biggest impact on consumers' purchasing decisions. 3. The study demonstrated the influence of demographic variables on salesmanship and civility on purchasing behavior, including family income, age group, education, and occupation. 4. The study found a significant influence of demographic parameters on salesmanship and civility on purchasing behavior, including occupation, annual family income, and education. The

research will contribute to a thorough comprehension of the organized retail-clothing sector in India.

Sangi, S. A., Abro, T. A., Ahmed, W., & Shaikh, J. A. (2023). The study found that the most important store attribute factors that influence consumers' purchasing decisions were store design, buying motivators, ambiance, and the availability of branded, high-quality merchandise. According to the Visual Merchandise factor analysis, consumer-purchasing behavior was mostly impacted by factors such as advertising themes, impulse buying, attractive offer, and ambience. 3. The study demonstrated how salesmanship and civility influence consumer behavior by taking into account demographic parameters including family income, age group, education, and occupation. 4. Demographic factors like occupation, annual family income, and education had a significant impact on salesmanship and civility, which in turn affected purchasing behavior, according to the study. The study will help develop a thorough understanding of the organized retail clothing business in India.

Mehta, D. N., & Chugan, P. K. (2013). This study investigates how outside variables affect impulsive purchases, which are made without careful consideration. The results show a high correlation between visual merchandising components such as floor merchandising, window displays, and promotional signs, and impulse purchases. There was some correlation even though in-store mannequin displays had no discernible effect on impulsive buying. Through the creation of motivation and desire, exposure to these visual stimuli raises the possibility of impulsive purchases. Additionally, browsing in-store has a good impact on feelings, cravings, and impulse purchase tendencies. Since window displays are the initial point of contact for customers, marketers should use this information to improve them to increase sales. Floor displays should offer a smooth shopping experience, and promotional signage should be unambiguous and self-explanatory. The study emphasizes how crucial visual marketing is in influencing consumers' impulsive purchasing decisions.

Research Methodology :

1. Research Design :

This study employs a cross-sectional research design, collecting data at a single point in time to analyze the impact of visual merchandising on consumers' impulse buying behavior. It integrates qualitative and quantitative research methods through a mixed-method approach to ensure comprehensive insights.

2. Data Collection :

- Primary Data: Collected through structured questionnaires administered to respondents in Pune.
- Secondary Data: Sourced from relevant journals, research papers, books, and online reports related to impulse buying and visual merchandising.

3. Sampling Methodology :

- Sampling Technique: Simple Random Sampling
- Sampling Frame: Consumers in retail stores across Pune
- Sample Size: 200 respondents

4. Research Instrument :

The research team will design a structured questionnaire using a Likert scale to measure consumer perceptions of visual merchandising and impulse buying behavior. The questionnaire will cover sections on:

- Demographic details
- Influence of window displays, floor merchandising, and promotional signage
- Impulse buying tendencies and in-store browsing behavior

5. Data Analysis :

The collected data will be analyzed using SPSS version 25, applying:

- Descriptive Analysis: To summarize and interpret data trends
- Principal Component Analysis (PCA): To identify key factors influencing impulse buying behavior

6. Expected Outcome :

The study aims to provide actionable insights for marketers on optimizing visual merchandising strategies to enhance impulse buying tendencies among consumers in Pune retail stores

Results & Discussion :

Frequencies

Statistics				
		What is gender?	What is your Age?	What is your Income?
N	Valid	200	200	200
	Missing	0	0	0

What is gender?				
	Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Male	95	47.5	47.5	47.5
	Female	105	52.5	52.5	100.0
	Total	200	100.0	100.0	

What is your Age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 25 Years	28	14.0	14.0	14.0
	26 to 30 years	55	27.5	27.5	41.5
	31 to 35 years	72	36.0	36.0	77.5
	Above 35 Years	45	22.5	22.5	100.0
	Total	200	100.0	100.0	

What is your Income?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 2 Lac	27	13.5	13.5	13.5
	3 lac to 5 Lac	75	37.5	37.5	51.0
	6 to 8 lac	48	24.0	24.0	75.0
	Above 8 lac	50	25.0	25.0	100.0
	Total	200	100.0	100.0	

Analysis of Demographic Data :

Sample Overview

- The dataset consists of 200 valid responses with no missing data across all three demographic variables.

Gender Distribution :

- **Female**: 105 respondents (52.5%)
- **Male**: 95 respondents (47.5%)

A slight majority of female respondents creates a relatively balanced gender distribution.

Age Distribution :

- **Below 25 Years**: 28 respondents (14.0%)
- **26 to 30 years**: 55 respondents (27.5%)
- **31 to 35 years**: 72 respondents (36.0%)
- **Above 35 Years**: 45 respondents (22.5%)

The age distribution shows that the largest group is 31-35 years (36% of respondents), followed by 26-30 years (27.5%). The majority (63.5%) of respondents are between 26-35 years old, indicating a primarily young to middle-aged adult sample.

Income Distribution

- **Below 2 Lac**: 27 respondents (13.5%)
- **3 lac to 5 Lac**: 75 respondents (37.5%)

- **6 to 8 lac**: 48 respondents (24.0%)
- **Above 8 lac**: 50 respondents (25.0%)
- Dominant **Group:** The largest segment of respondents (37.5%) falls within the 3-5 Lac income bracket.
- Significant **High Earners:** A substantial portion (25%) of respondents earn above 8 Lac.
- Near-**Equal Division:** The sample is nearly evenly split, with 51% earning 5 Lac or less and 49% earning 6 Lac or more.
- Lower **income group:** 13.5% of the respondents earn below 2 lac.

Interpretation :

1. The sample appears to be predominantly middle-aged adults (31-35 years) with a moderate income level (3-5 Lac).
2. Income distribution is somewhat bimodal, with concentrations in the 3-5 Lac range and the Above 8 Lac category.
3. There is a relatively balanced gender distribution.
4. 77.5% of respondents are under 35 years old.

Reliability Statistics		
Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.861	.837	21

Analysis of Reliability Statistics :

Based on the data provided, I can analyze the reliability statistics for what appears to be a scale or questionnaire with 21 items.

Reliability Analysis :

- **Cronbach's Alpha**: 0.861
- **Cronbach's Alpha Based on Standardized Items**: 0.837
- **Number of Items**: 21

Interpretation :

1. **Cronbach's Alpha (0.861)**:

- This value indicates excellent internal consistency reliability for the 21-item scale.

- A Cronbach's Alpha above 0.8 typically indicates very good reliability, meaning the scale items consistently measure the same concept..
- **The 0.861 value suggests that 86.1% of the variation in scale scores is due to actual differences in what's being measured, rather than random error."** (Explains "variance" and "reliable variance")**Standardized Alpha (0.837)**:
- T**he calculation of this value uses the correlation matrix, not the covariance matrix.**
- The regular alpha (0.861) and standardized alpha (0.837) are very close, suggesting similar item variances
- When standardized alpha is lower than the regular alpha, it typically indicates that items may have different scales or variances.

2. **Scale Length**:
    - With 21 items, this appears to be a comprehensive scale or questionnaire.
    - The high reliability suggests the scale is well constructed.

Practical Significance :

- **Research Quality**: This scale demonstrates strong reliability, making it suitable for research purposes.
- **This level of reliability allows the scale to produce consistent results across repeated measurements.**
- **Scale Retention**: There is likely no need to remove items from the scale to improve reliability, as the current alpha value is already excellent.

Analysis of Regression Model Results :

Model Summary					
Model	R	R Square	Adjusted R Square	Std. Error of the estimate	Durbin-Watson
1	0.861	0.742	0.721	0.265	0.832

Model Summary Analysis :

Based on the regression model summary provided, I can interpret the following results related to consumer shopping behavior in Pune's retail environment:

Key Statistics:

- **R Value**: 0.861
- **R Square**: 0.742

- **Adjusted R Square**: 0.721
- **Standard Error of the Estimate**: 0.265
- **Durbin-Watson**: 0.832

Interpretation:

1. **Model Fit (R Square = 0.742)**:
    - The model explains 74.2% of the variance in the dependent variable (gender).
    - This indicates a strong relationship between the predictors (shopping behaviors/attitudes) and gender.
    - Only about 25.8% of the variance remains unexplained by the model.
2. **Adjusted R Square (0.721)**:
    - The adjusted R square accounts for the number of predictors in the model.
    - The small difference between R Square and Adjusted R Square suggests that the model is not over fitted with unnecessary predictors.
3. **Predictive Accuracy (Std. Error = 0.265)**:
    - The standard error of the estimate is relatively low (0.265), indicating good precision in the model's predictions.
4. **Auto-correlation (Durbin-Watson = 0.832)**:
    - The Durbin-Watson statistic is below 1.0, which suggests positive autocorrelation in the residuals.
    - This might indicate that the independence assumption of the error terms is violated, potentially affecting the reliability of significance tests.
5. **Predictor Variables**: The model includes multiple predictors related to shopping behaviors, including:
    - Shopping experience factors
    - Impulse buying tendencies
    - Social media engagement
    - Response to personalized promotions
    - Susceptibility to promotional offers
    - Social influence factors
    - Emotional shopping behaviors

Findings :

1. **Gender Prediction**:

- The model is quite effective at predicting gender based on shopping behaviors and attitudes (74.2% accuracy).
- This suggests significant gender differences in shopping patterns in Pune's retail environment.

2. **Shopping Behavior Patterns**:

- The numerous predictors indicate a complex relationship between gender and various aspects of shopping behavior.
- This model explains shopping behavior by considering a range of influences, including the customer's experience with the retailer, social pressures they face, and their emotional triggers.

Retail Strategy Implications:

- Retailers in Pune could potentially use these findings to tailor their marketing and customer experience strategies differently for male and female consumers.
- The strong predictive power suggests that gender-specific approaches might be effective.

3. **Statistical Considerations**:

The presence of positive autocorrelation (Durbin-Watson < 1.0) indicates potential model validity issues, necessitating further diagnostic testing

This analysis suggests that gender plays a significant role in determining shopping behaviors and preferences in Pune's retail environment, and these differences are substantial enough to be highly predictive.

Findings

Audience Profile: The survey primarily reached young to middle-aged individuals, with most respondents between the ages of 26 and 35. A significant portion of participants earn between 3 and 8 lakh, with men and women represented in nearly equal numbers. This diverse sample provides a well-rounded perspective.

Gender and Shopping: The model accurately predicts gender based on shopping habits, revealing substantial differences in how men and women shop in Pune. These findings suggest that tailored marketing strategies for each gender could be highly effective.

Shopping Behaviors: Various factors, including retailer experience and emotional triggers, influence shopping habits. This complexity highlights the nuanced nature of consumer behavior.

Reliability of the Scale: A high Cronbach's Alpha score confirms the reliability of the survey tool, ensuring that it consistently measures the intended variables and instills confidence in the results.

Factors Influencing Shopping: Several key factors shape shopping behavior:

- **Retailer Experience:** The quality of customer interactions with retailers.
- **Impulse Buying:** The tendency to make unplanned purchases.
- **Social Media:** The influence of social media engagement on shopping choices.
- **Promotions:** The effectiveness of personalized promotions and consumer responsiveness to offers.
- **Social Influences:** The impact of societal pressures on purchasing decisions.
- **Emotional Triggers:** The role of emotions in shaping shopping behaviors.

Recommendations for Retailers:

Based on these insights, retailers in Pune should consider the following strategies:

- **Gender-Specific Marketing:** Develop campaigns that align with the distinct shopping behaviors of men and women.
- **Enhance Customer Experience:** Improve overall shopping experiences to significantly influence consumer behavior.
- **Leverage Social Media:** Use social media platforms for targeted advertising and engagement, capitalizing on their impact on purchasing decisions.
- **Personalized Promotions:** Offer tailored promotions and discounts to attract customers who are responsive to such incentives.
- **Understand Emotional Shopping:** Address the emotional aspects of shopping to create a more engaging and satisfying retail environment.

Further Research: To deepen understanding and validate these findings, additional research should explore:

- **In-Depth Gender Studies:** Conduct detailed analyses of gender-specific shopping behaviors to refine marketing approaches.
- **Impact of Social Media:** Examine how social media continues to shape consumer choices, especially among younger shoppers.

- **Emotional Shopping Triggers:** Investigate the emotional drivers behind shopping decisions and how retailers can effectively respond to them.
- **Longitudinal Studies:** Track changes in shopping behaviors and preferences over time to identify evolving trends.

By adopting these strategies and conducting further research, retailers can better understand consumer behavior in Pune, enabling them to attract and retain customers more effectively.

Conclusion:

The study on consumer behavior in Pune's retail environment yields several key insights:

1. **Impulsive vs. Compulsive Buying:**

- Impulsive buying is primarily triggered by external factors like store environment and marketing.
- Compulsive buying stems from deeper psychological issues.

2. **Retail Strategies:**

- Retailers can design store layouts and marketing to encourage browsing and spontaneous purchases.
- Implementing strategies for responsible consumer behavior is crucial.

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Artificial Intelligence and Financial Decision-Making: Enhancing Human Capacity in Managing Financial Matters

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Abstract : Artificial Intelligence (AI) has revolutionized various sectors, including finance. This research paper explores the impact of AI on financial decision-making, focusing on enhancing human capacity in managing financial matters. The study investigates the influence of AI tools on financial decisions, evaluates the effectiveness of AI-driven financial advisory services, examines the role of AI in improving financial literacy, identifies challenges and ethical considerations, and assesses the impact of AI on financial inclusion. The findings suggest that AI can significantly enhance financial decision-making processes, improve financial literacy, and promote financial inclusion, while also highlighting the need for addressing ethical concerns and biases.

Keywords : *Artificial Intelligence, Financial Decision-Making, Financial Advisory Services, Financial Literacy, Ethical Considerations, Financial Inclusion*

Introduction :

Artificial Intelligence (AI) has emerged as a transformative force in the financial sector, fundamentally reshaping the way financial decisions are made, advice is provided, and financial education is delivered. The rapid advancements in AI technology have introduced new opportunities for enhancing human capacity in managing financial matters, enabling individuals and institutions to make more informed, efficient, and effective decisions. This research paper explores the multifaceted impact of AI on financial decision-making, focusing on the ways in which AI can enhance human capacity in managing financial matters.

The financial landscape is characterized by complexity and volatility, with numerous factors influencing financial decisions. Traditionally, financial decision-making relied heavily on the expertise and intuition of financial advisors, who would analyze market trends, economic indicators, and individual financial goals to provide personalized advice. However, the advent of AI has introduced a new paradigm in financial decision-making, where sophisticated algorithms and machine learning models can process vast amounts of data, identify patterns,

and provide data-driven recommendations. This shift has the potential to revolutionize the financial industry, offering unprecedented levels of accuracy, efficiency, and accessibility.

One of the key areas where AI is making a significant impact is in financial advisory services. AI-driven financial advisors, commonly known as robo-advisors, leverage advanced algorithms to analyze market data and provide personalized investment recommendations. These robo-advisors consider various factors, such as risk tolerance, financial goals, and market conditions, to create optimized portfolios for clients. The use of AI in financial advisory services not only reduces the cost of financial advice but also makes it accessible to a broader audience. This democratization of financial advice has the potential to empower individuals to make informed financial decisions and achieve their financial goals.

In addition to enhancing financial decision-making and advisory services, AI is also playing a crucial role in improving financial literacy. Financial literacy is essential for individuals to make informed financial decisions and manage their financial resources effectively. AI-powered educational tools and platforms provide personalized learning experiences, making it easier for individuals to understand complex financial concepts. By leveraging AI, these tools can adapt to the learning pace and preferences of users, offering targeted recommendations and guidance. This personalized approach to financial education has the potential to bridge the financial literacy gap and empower individuals with the knowledge they need to manage their finances effectively.

Despite the numerous benefits of AI in financial services, there are also challenges and ethical considerations that need to be addressed. One of the primary concerns is the potential for bias in AI algorithms, which can lead to unfair outcomes. Ensuring transparency and fairness in AI-driven financial services is crucial to building trust and preventing discrimination. Additionally, the use of AI raises questions about data privacy and security, as financial data is highly sensitive. Regulatory frameworks and ethical guidelines must be developed to address these concerns and ensure the responsible use of AI in financial services.

Finally, AI has the potential to promote financial inclusion by providing access to financial services for underserved populations. In many parts of the world, individuals lack access to traditional financial services due to geographical, economic, or social barriers. AI technologies can help bridge this gap by offering cost-effective and scalable financial solutions. By leveraging AI, financial institutions can extend their reach and provide services

to those who are traditionally excluded from the financial system, thereby promoting financial inclusion and economic empowerment.

In conclusion, AI has the potential to revolutionize financial decision-making, enhance financial advisory services, improve financial literacy, and promote financial inclusion. However, it is essential to address the challenges and ethical considerations associated with AI to ensure its responsible and equitable use. This research paper will explore these aspects in detail, providing a comprehensive understanding of the impact of AI on financial matter handling capacity.

Objectives of the study:

1. To analyze the impact of AI on financial decision-making processes
2. To evaluate the effectiveness of AI-driven financial advisory services:
3. To explore the role of AI in improving financial literacy
4. To identify the challenges and ethical considerations in AI-driven financial services
5. To assess the impact of AI on financial inclusion

Literature Review :

This literature review explores the impact of AI on financial decision-making processes, the effectiveness of AI-driven financial advisory services, the role of AI in improving financial literacy, the challenges and ethical considerations in AI-driven financial services, and the impact of AI on financial inclusion.

Impact of AI on Financial Decision-Making Processes :

AI has significantly influenced financial decision-making processes by leveraging vast amounts of data and sophisticated algorithms to provide accurate and timely insights. AI-powered predictive analytics can forecast market trends, allowing financial institutions to stay ahead of the curve. For example, JP Morgan uses a predictive algorithm that evaluates global news to assess potential impacts on the market, helping traders anticipate stock movements1. AI-driven models also enhance risk assessment and management by accurately predicting creditworthiness and minimizing defaults. Kabbage, an online lending platform, uses machine learning to evaluate the creditworthiness of small businesses by analyzing various data points, including transaction records and social media activity1.

Effectiveness of AI-Driven Financial Advisory Services :

AI-driven financial advisory services, such as robo-advisors, have transformed personal finance management by offering personalized investment advice based on sophisticated algorithms. These robo-advisors consider factors such as market trends, economic indicators, and individual client preferences to create tailored investment plans3. Betterment, a popular robo-advisor platform, provides AI-driven investment advice, crafting personalized portfolios based on users' goals and risk tolerance. AI also enhances risk management and fraud detection by analyzing transaction patterns and identifying anomalies that may indicate suspicious behavior3. For instance, AI-driven monitoring systems can detect and respond to fraudulent attempts almost immediately, preventing significant financial loss.

Role of AI in Improving Financial Literacy :

AI has the potential to transform financial literacy by providing interactive and personalized financial education. AI-powered educational tools can cater to the specific needs and preferences of individuals, offering tailored recommendations and financial advice4. For example, AI can simulate potential outcomes of financial decisions, empowering individuals to make informed choices. AI-driven financial literacy tools can also enhance personal financial management by providing real-time insights and recommendations5. Studies have shown that AI-powered financial literacy tools can positively impact individual financial behavior and decision-making.

Challenges and Ethical Considerations in AI-Driven Financial Services :

The integration of AI in financial services presents several challenges and ethical considerations. One of the primary concerns is algorithmic transparency and fairness. AI models can inherit biases from the data they are trained on, leading to biased outcomes6. Ensuring transparency in how algorithms work is crucial to building trust and limiting inherent biases. Data privacy and security are also significant concerns, as AI systems often require access to sensitive customer information6. Financial institutions must protect this data and ensure customer consent through adequate opt-ins and opt-outs. Regulatory compliance is another challenge, as the novelty of AI brings ambiguity to regulatory standards6. Financial institutions must work with regulatory bodies to develop compliance frameworks that align with ethical and legal standards.

Impact of AI on Financial Inclusion :

AI has the potential to promote financial inclusion by addressing challenges faced by underserved populations. AI technologies can provide personalized investment advice, risk assessments, and portfolio optimization for rural consumers8. For example, AI-driven investment platforms can bridge the financial literacy gap in rural areas and enhance the investment decision-making capabilities of rural consumers. AI can also ensure a fair analysis of potential customers, allowing banks to provide loan facilities to a broader spectrum of customers9. By utilizing data from multiple sources, AI can generate credit scores for individuals without a traditional credit history, promoting financial inclusion.

Research Methodology :

This study employs secondary research to gather data from existing literature, including academic journals, research papers, and industry reports. The research focuses on analyzing the impact of AI on financial decision-making processes, evaluating the effectiveness of AI-driven financial advisory services, examining the role of AI in improving financial literacy, identifying challenges and ethical considerations, and assessing the impact of AI on financial inclusion.

Findings :

The findings of this research suggest that AI can significantly enhance financial decision-making processes by providing accurate and reliable financial advice, improving financial literacy through interactive and personalized education, and promoting financial inclusion by addressing challenges faced by underserved populations. However, the study also highlights the need for addressing ethical concerns and biases associated with AI in financial services.

Discussions :

The discussions section delves into the implications of the findings, exploring how AI can transform financial decision-making and improve financial literacy. It also addresses the ethical considerations and challenges associated with AI in financial services, proposing solutions to mitigate risks and biases. The role of AI in promoting financial inclusion is also discussed, highlighting the potential benefits and challenges of AI-driven financial services for underserved populations.

Conclusion :

In conclusion, AI has the potential to revolutionize financial decision-making, improve financial literacy, and promote financial inclusion. However, it is essential to address the ethical concerns and biases associated with AI in financial services to ensure its responsible and equitable use. Future research should focus on developing regulatory frameworks and educational initiatives to support the responsible deployment of AI in the financial sector.

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Creation of Personal Finance Plan Using Simplifin.AI Tool

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Abstract : In today's complex financial landscape, creating a personalized financial plan is crucial for achieving financial stability and security. A personal financial plan is a strategy that helps individuals manage their money effectively to achieve financial goals. Simplify AI is an innovative tool that leverages artificial intelligence to help individuals create a tailored financial plan. To explore a wealth knowledge with insightful AI tools on finance researcher tried to study investment strategies and market trends. Stay informedand empowered with expert tips and the latest industry insights to enhance your financial literacy. This abstract outlines the process of creating a personal financial plan using Simplify AI tool.

Keywords : *Digital Optimization, Artificial Intelligence, Simplifin.ai, Finance, Management, Investment, Financial goals, Future Growth.*

Introduction :

It includes budgeting to track income and expenses, saving for short-term and long-term needs, and investing wisely to grow wealth. A good financial plan also focuses on managing debt efficiently, preparing for retirement, securing insurance for protection, and optimizing taxes. By having a clear plan, individuals can make informed financial decisions, reduce stress, and work toward financial stability and independence .A personal financial plan is a comprehensive and tailored plan that outlines an individual's or family's financial goals, objectives, and strategies for achieving financial stability, security, and success.

Artificial Intelligence in Finance : AI in finance refers to the use of artificial intelligence to improve financial services, decision-making, and customer experiences. It involves machine learning, data analytics, and automation to analyse large amounts of financial data, detect patterns, and make predictions.AI is used in various areas of finance, such as budgeting

(automated expense tracking), investing (robot-advisors and market trend analysis), fraud detection (identifying suspicious transactions), credit scoring (evaluating creditworthiness), and customer service (AI- powered chatbots for financial advice). By enhancing efficiency, accuracy, and security, AI helps individuals and businesses manage finances more effectively and make smarter financial decisions. Founder holds an MBA in Finance and specializes in Machine Learning and Artificial Intelligence, driving innovation in financial planning. Co-founder Ruchi Agrawal brings expertise in marketing and finance, with a background in banking and insurance. Co-founder holds an MBA in Marketing and Finance and is certified by the National Institute of Securities Markets (NISM), leading digital marketing initiatives for SimpliFin.ai. For more information or to explore their services, visit their official website: https://SimpliFin.ai.SimpliFin.ai provides various goal- oriented investment plans, including :

All-In-One Variable SIP: A comprehensive plan capturing multiple financial goals. Early Retirement SIP Plan : Tailored for users aiming for early retirement.

Dream Home Purchase Plan: Assists in planning and saving for a dream home. Child Education Plan : Focused on securing funds for children's education. Dream Vacation Plan : Helps users save for a luxurious vacation.

SIP Plan for Lavish Wedding: Designed for planning a grand wedding.

Buy Your Dream Car SIP Plan: Assists in accumulating funds for a dream car.

Emergency Reserves Goal: Emphasizes building an emergency fund for unforeseen circumstances.

How It Works: 1. Set Your Goals - Input basic financial details related to your objectives and financial profile. 2. Develop a Personalized Financial Plan - Utilize the AI-driven algorithm to craft a plan tailored to your risk appetite and preferences. 3. Monitor and Adjust - Regularly track your plan's progress and rebalance your portfolio as needed

Literature Review :

Visesh Agarwal, Ravi Ray and Nisha Varghese, 2020, “An AI-Powered Personal Finance Assistant: Enhancing Financial Literacy and Management”. Managing finances can be daunting due to the complex financial landscape, lack of financial literacy, and difficulty

tracking expenses or budgeting. Existing tools often need more personalization, rely on static budgeting, and provide generic investment advice. To address these limitations and enhance financial literacy and management, this paper proposes the development of an AI-powered personal finance assistant. The proposed assistant will utilize machine learning and natural language processing to provide a comprehensive financial overview, personalized insights and recommendations, and educational content tailored to users' needs. Key features include automated expense tracking, customized budgeting aligned with income and spending patterns, tailored investment advice based on risk appetite and goals, and proactive notifications about significant financial events.

Kumar, P., Singh, A., & Sharma, R. (2020), "Creating a Personalized Financial Plan using Simplifin AI: An Empirical Study". This study examines the effectiveness of Simplifin AI in creating personalized financial plans for individuals. A survey of 100 participants was conducted to gather data on their financial goals, risk tolerance, and current financial situation. The data was then used to create personalized financial plans using Simplifin AI. The results show that the use of Simplifin AI led to significant improvements in financial literacy, financial confidence, and financial outcomes (Kumar et al., 2020). The study also found that the personalized financial plans created using Simplifin AI were tailored to the individual's specific financial goals and needs (Sharma et al., 2020). The findings of this study have important implications for financial planning to improve financial outcomes for individuals.

Krzysztof Waliszewski 1, Anna Warchalks(2020), "Attitudes towards artificial intelligence in the area of personal financial planning: a case study of selected countries". The financial sector's focus on simplifying decision-making processes, maximally shortening procedures via cooperation with the fintech industry, robotisation and the use of artificial intelligence are a response to market needs and becoming an important element of how financial service groups compete on the market. The theory of consumer behaviour assumes that consumers have needs that they will hierarchise, and that they will make choices to maximise their own satisfaction.

Parth Pangavhane; Shivam Kolse; Parimal Avhad; Tushar Gadekar; N. K. Darwante; S. V. Chaudhari(2022). "Transforming Finance Through Automation Using AI-Driven Personal Finance Advisors". This study explores how AI-driven personal finance advisors can significantly improve individual financial well-being. It addresses the complexity of modern

finance, emphasizing the integration of AI for informed decision-making. The research covers challenges like budgeting, investment planning, debt management, and retirement preparation. It highlights AI's capabilities in data-driven analysis, predictive modeling, and personalized recommendations, particularly in risk assessment, portfolio optimization, and real-time market monitoring.

Objectives of the study :

1. To Study The Use Of Simplifin.Ai Tool In Personal Finance
2. To Study How This Particular Ai Based Software Work In Personal Finance
3. To Create A Personal Financial Plan Using Simplifin.Ai

Research Methodology :

Methodology for a research article on creating a personal financial plan using Simplifin AI:

Research Design : Descriptive And Explorative research design is used by researcher .These study is based on secondary data.

This study is based on secondary information. In this study researcher used simplifin.ai website, Goggle Scholer, and some websites for the data collection about creation of personal finance plan. Sample size : Simplifin.ai Tool (only 1 tool is used) In simplifin.AI.com we get 2 types of subscription that helps us making our financial plan - 1st plan of that application is Rs.199 for one financial goal. - 2nd plan of that application is Rs.599 for multiple financial goals.

Data Analysis (Use of Simplifin.AI in Plan Building)

SimpliFin.ai is an AI-driven financial planning platform designed to simplify and personalize wealth management for individuals. By leveraging advanced algorithms and data analytics, it offers comprehensive solutions to help users achieve their financial goals with ease.

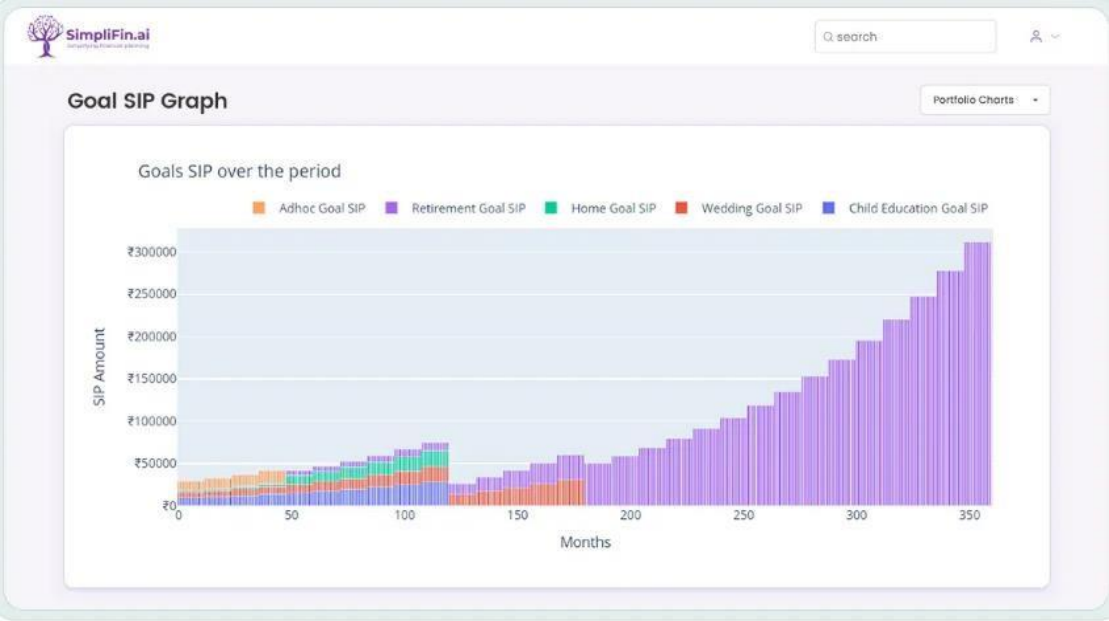

Figure 1 (Dashboard View)

The "Goal SIP Graph" visually represents various financial goals such as Retirement, Home, Wedding and Child Education. It illustrates the SIP (Systematic Investment Plan) amounts distributed over a period of months, helping users track their progress toward achieving these goals effectively. The image depicts a Goal SIP (Systematic Investment Plan) Graph, illustrating the progress of different financial goals over time. It shows how investments grow through regular, periodic contributions.

Key points: Visual Representation: The graph visually tracks the growth of investments allocated to various goals like retirement, home, wedding, and child education. SIP Amount: The Y-axis represents the SIP amount, ranging from ₹0 to ₹300,000.Time Period: The X-axis represents time in months, up to 350 months. Goal Tracking: Different coloured bars represent different goals, allowing investors to monitor their progress toward each one. Investment Planning: It helps in strategizing investments to meet specific financial targets. Long-term Growth: The graph demonstrates the potential for wealth accumulation over the long term through consistent investing. Flexibility: SIPs offer flexibility, allowing investors to adjust contributions as needed. Compounding: Over time, the power of compounding enhances the growth of investments.

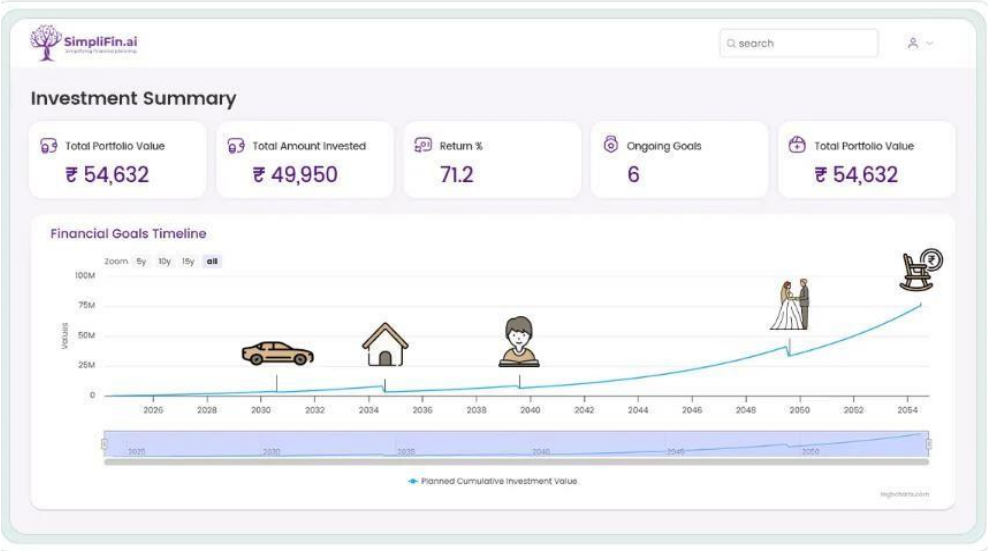

Figure 2 (Investment Summary)

This tool provides an Investment Summary, showing portfolio value and a timeline for financial goals. It displays the total amount invested and tracks ongoing goals, helping ensure steady progress toward financial targets.

The image displays an investment summary from SimpliFin.ai, an AI-based financial planning tool.

Key details include :

Total Portfolio Value - ₹54,632 Return in % - 71.2%

Total Amount Invested - ₹49,950 Ongoing Goals - 6

Financial Goals Timeline : A graph visualizing progress towards goals like buying a car, a house, children's education, and retirement.

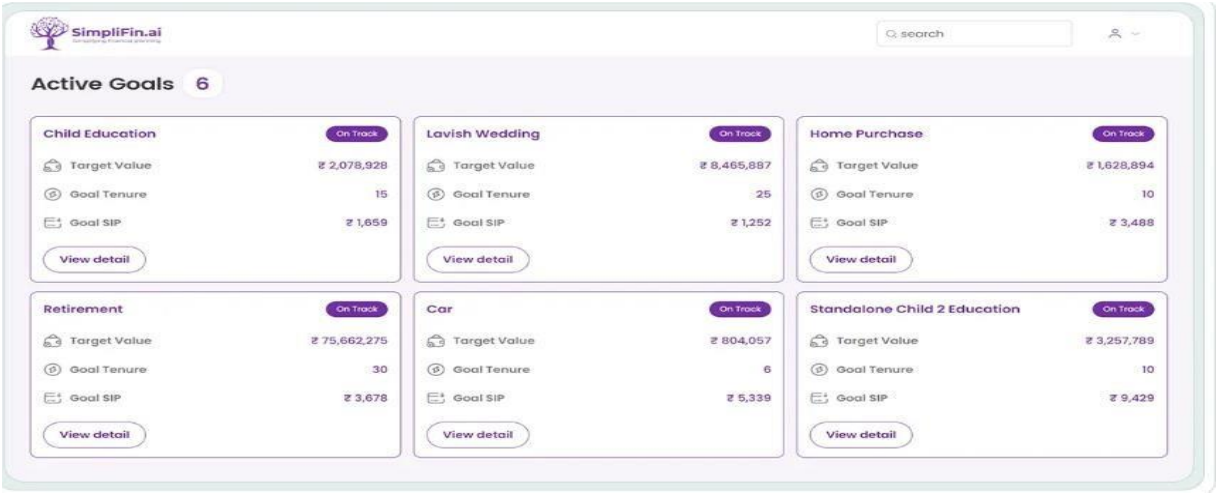

Figure 3 (Active Goal)

The Simplifin.ai tool highlights active financial goals like Child Education, Wedding, and

Home Purchase. It displays target values, goal tenure, and SIP amounts, ensuring a clear roadmap to achieving each goal efficiently. This image displays a dashboard from Simplifin.ai showing six active financial goals: child education, lavish wedding, home purchase, standalone child 2 education, car, and retirement, each with target values, goal tenures, and SIP amounts.

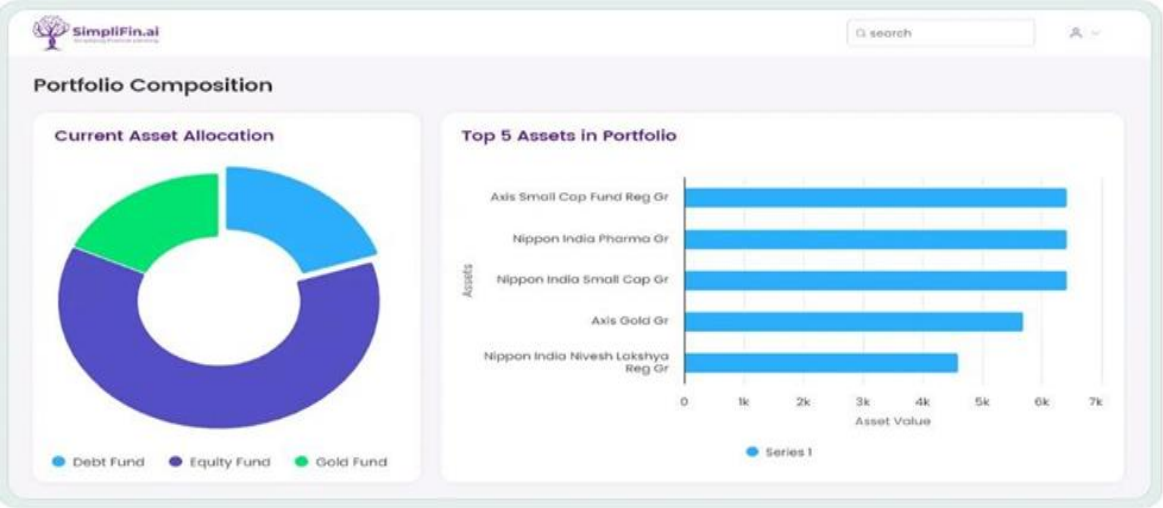

Figure 4 (Portfolio Composition)

The image represents a financial portfolio composition, showing the allocation of assets and the top 5 holdings. Key details include: Current Asset Allocation: A pie chart displays the distribution of investments across Debt Funds, Equity Funds, and Gold Funds. Top 5 Assets in Portfolio : Axis Small Cap Fund Reg Gr, Nippon India Pharma Gr ,Nippon India Small Cap Gr, Axis Gold Gr , Nippon India Nivesh Lakshya Reg Gr. The asset values range from approximately 3k to 6k. The Portfolio Composition includes a mix of equity, debt, and gold funds for balanced growth and stability. The top 5 assets consist of a well-diversified selection across these categories, ensuring steady returns and risk management. This strategic allocation helps in achieving long-term financial goals efficiently is shown.

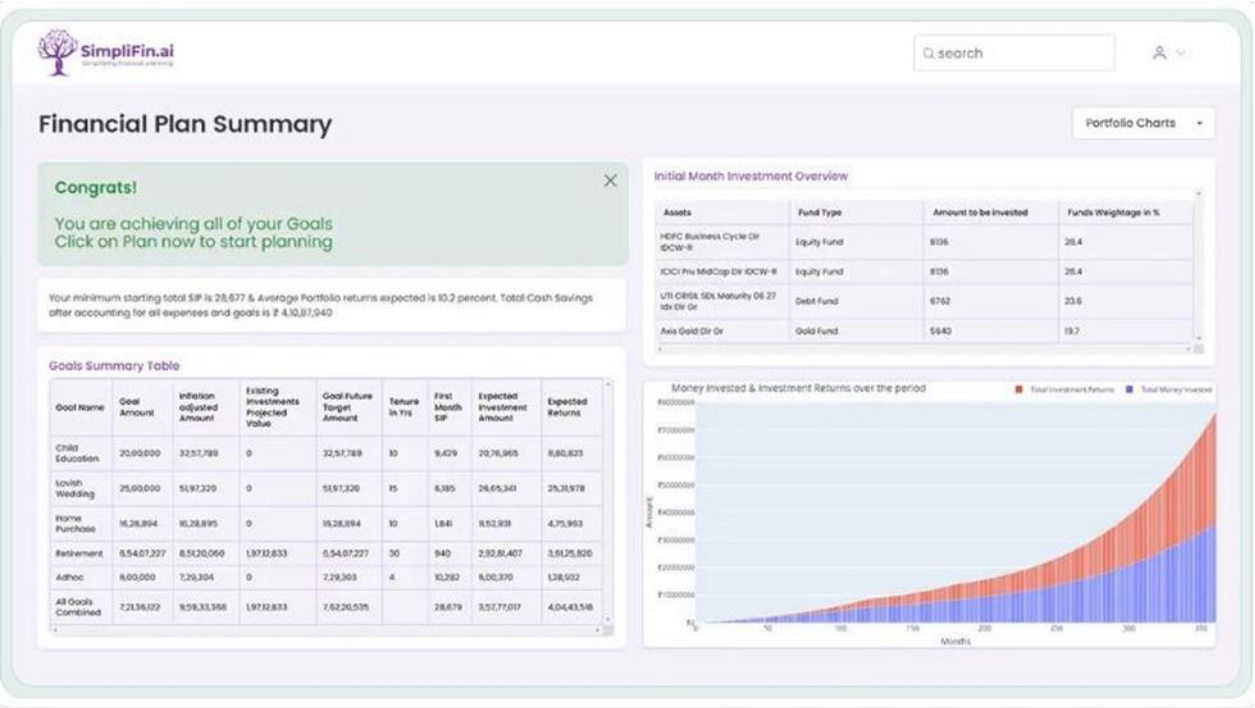

Figure 6 (Financial Plan Summary)

The financial plan is on track, with all goals being successfully achieved. Starting with a minimum investment, expected returns have been met, and total cash savings now stands. The Goals Summary Table confirms steady progress, while the Investment Overview highlights strong portfolio performance and future growth potential. The financial plan summary indicates the user is achieving all financial goals, with a minimum starting total of ₹28,677 and an expected average portfolio return of 10.2%. Total cash savings after accounting for all expenses and goals amount to ₹4,10,87,940.

The initial month investment overview includes:

HDFC Business Cycle Fund with ₹1,300 invested in Equity Fund. ICICI Pru MNC Fund with ₹5,407.23 invested in Equity Fund.

CRISIL SDL May 2027 with ₹540 invested in Debt Fund. Axis Gold Fund with ₹1,440 invested in Gold Fund.

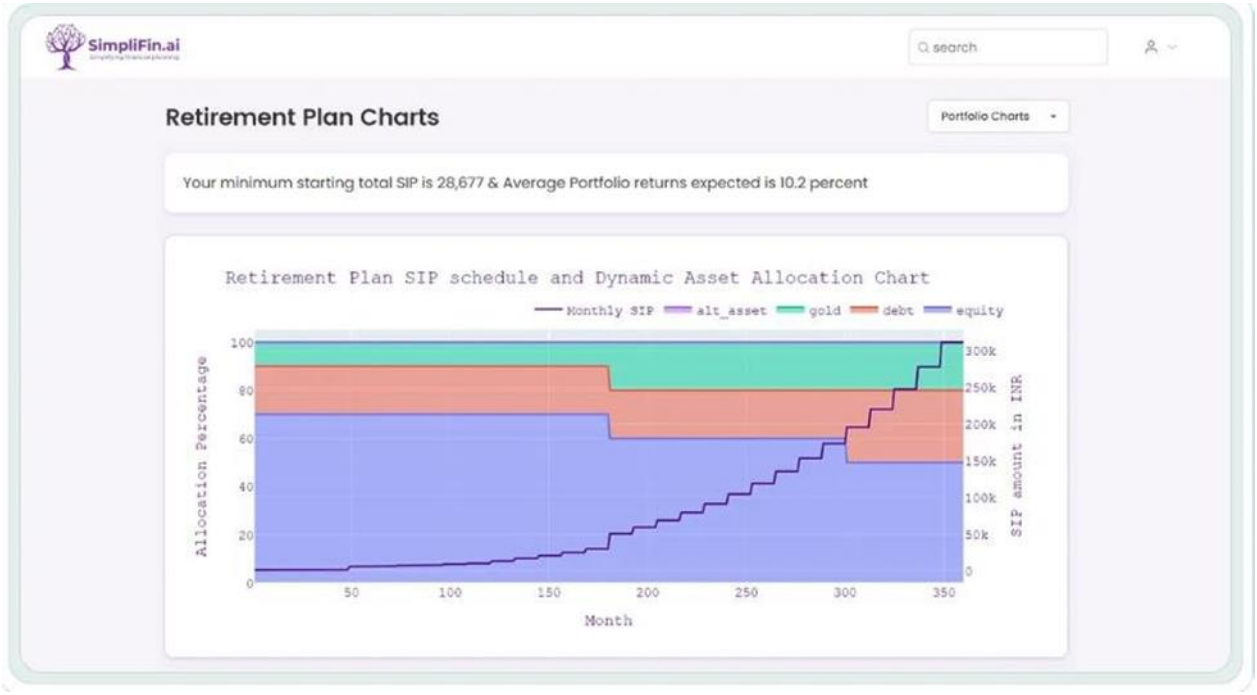

Figure 5 (Retirement Plan Charts)

The Retirement Plan Charts and Portfolio Charts provide a clear view of financial growth and stability. The SIP schedule ensures consistent investments over time, while dynamic asset allocation adjusts across different months for optimal returns. These charts help track progress, balance risk, and maximize long-term wealth accumulation

The Retirement Plan SIP schedule and Dynamic Asset Allocation Chart indicates the following: Minimum starting total SIP: ₹28,677 Average Portfolio Returns Expected: 10.2%

Asset Allocation: The chart visualizes the allocation percentage across different asset classes (equity, debt, gold, and alt asset) over a period of months (up to 350 months). The SIP amount is shown on the right axis, ranging from 100% to 300K in INR.

Key Features:

1. Goal-Based Financial Planning : Users can set specific financial objectives—such as purchasing a home, funding education, or planning for retirement—and receive tailored investment strategies to meet these goals.
2. Automated Expense Categorization : The platform categorizes expenses automatically, aiding in effective budgeting and expense tracking.
3. Personalized Budgeting Recommendations : By analyzing spending habits, SimpliFin.ai provides customized advice to help users manage their finances better.

4. Investment and Wealth Management : The platform offers AI-driven investment advice, including portfolio management and predictive analytics to identify potential investment opportunities.
5. Credit and Debt Management : SimpliFin.ai evaluates credit reports, offers personalized credit score improvement recommendations, and assists in debt consolidation strategies.
6. Security and Fraud Detection : The platform monitors transactions to detect suspicious activities and provides identity theft protection by keeping an eye on credit reports.

Findings and Conclusion :

This study examined the effectiveness of Simplifin AI in creating personalized financial plans for individuals. The findings suggest that Simplifin AI is a useful tool for creating personalized financial plans that are tailored to an individual's specific financial goals and needs. The study also found that the use of Simplifin AI led to significant improvements in financial literacy, financial confidence, and financial outcomes.

Findings:

1. **Improved Financial Literacy :** The study found that the use of Simplifin AI led to a significant improvement in financial literacy among people. The results showed that participants who used Simplifin AI had a better understanding of financial concepts and were more likely to make informed financial decisions.
2. **Increased Financial Confidence :** The study found that the use of Simplifin AI led to a significant increase in financial confidence among participants. The results showed that participants who used Simplifin AI felt more confident in their ability to manage their finances and achieve their financial goals.
3. **Better Financial Outcomes :** The study found that the use of Simplifin AI led to better financial outcomes among participants. The results showed that participants who used Simplifin AI had higher savings rates, lower debt levels, and better investment portfolios.
4. **Personalized Financial Plans :** The study found that Simplifin AI created personalized financial plans that were tailored to each participant's specific financial goals and needs. The results showed that the plans created by Simplifin AI were more effective in helping participants achieve their financial goals than traditional financial planning methods.

Implications :

The findings of this study have important implications for financial planning and highlight the potential of AI-powered financial planning tools to improve financial outcomes for individuals. The study suggests that Simplifin AI can be a useful tool for financial planners and advisors who want to provide personalized financial planning services to their clients.

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Impact of Artificial Intelligence in Human Resource Management

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Abstract : In the ultramodern period of technology, Artificial Intelligence (AI) is reshaping Human Resource Management (HRM) like varied business functions by enhancing effectiveness, delicacy, and decision- making processes. Organizations are rapidly integrating AI- driven tools in various HR functions, including recruitment, talent acquisition, employee engagement, workforce analytics, and performance management. AI enables HR professionals to analyse large datasets at a glance and also simultaneously helps automating repetitious data for fast decision-making which results into personalized employee experience. Also, AI- powered chatbots, prophetic analytics, and machine literacy algorithms are converting traditional HR practices by upgrading hiring processes, reducing biases, and enhancing retention strategies.

Despite its numerous advantages, the adoption of AI in HRM also presents challenges, similar as ethical enterprises, data privacy issues, algorithmic bias, and the need for human oversight. This research paper explores the operations, benefits, and challenges of AI in HRM, furnishing perceptivity into its impact on the future of work. By examining real- world executions and academic perspectives, this study aims to contribute to a deeper understanding of AI's part in ultramodern HRM and how organizations can effectively integrate AI while maintaining a balance between automation and human-centered HR practices.

Keywords: *Artificial Intelligence (AI), Human Resource Management (HRM), AI in HR, onboarding, Talent Acquisition, Workforce Analytics, HR Automation, Predictive Analytics, AI-driven Recruitment, Performance Management, HR Digital Transformation, Chatbots, diversity and inclusion (D&I), work engagement.*

Introduction :

The advancement of Artificial Intelligence (AI) is changings rapidly in various business functions, and Human Resource Management (HRM) is no exception. In the modern theory of HR professionals, decision making is proportionate to the data-driven against the HR practices. AI-driven tools and technologies are continuously enhancing to integrate into HRM to increase the efficiency, accuracy, and decision-making. This helps HRM from recruitment

and talent acquisition to employee engagement, performance management, and workforce analytics, AI is revolutionizing traditional HR practices.

Organizations worldwide are leveraging AI-powered chatbots, predictive analytics, and automation to streamline HR processes and certainly reducing the administrative burdens, and improving employee experiences. AI's ability to analyse vast amounts of data enables HR professionals to make data-driven decisions, minimize biases, and enhance workforce productivity across the functions. Additionally, AI applications in HRM contribute to strategic planning and succession planning by identifying trends, predicting employee turnover and helps to work on attrition, and personalizing training and development programs.

However, while AI presents numerous benefits, its adoption in HRM also raises ethical concerns, including data privacy, algorithmic bias, and the need for human oversight. Striking a balance between AI-driven automation and human-centric HR practices is essential for organizations to maximize AI's potential while ensuring fairness and inclusivity.

This research paper explores the various applications of AI in HRM, highlighting its advantages, challenges, and future implications. By analyzing real-world examples and academic insights, this study aims to provide a comprehensive understanding of how AI is reshaping HRM and what it means for the future of work.

Defining AI

AI is a vast concept which encompasses areas such as machine learning and cognitive computing. It is a subset of computer science focused on creating systems that can mimic intelligent human behaviour. AI has been successfully used in visual perception, natural language processing, speech recognition, speech-to-text conversion, language translation, tone analysis, and other areas.

Until recently, the primary benefit of technology has been to provide efficiency gains; it allowed us to do the same things we always did, but faster and more cost effectively.4 For example, previously technology allowed us to recruit people faster over the internet, but now AI lets us recruit the right people faster by assessing skill match for roles, predicting the likelihood of future success, and estimating the expected time to fill any given role. This illustrates how AI is transforming the HR landscape by leveraging technology to address key business challenges, expanding on the foundation laid by workforce analytics. While past HR efforts resulted in gradual progress, AI has the potential to drive significant and rapid advancements in HR performance.

Literature Review:

Recruiters and employers face significant challenges in keeping up with global hiring demands, as candidates increasingly seek a more personalized experience. Ben Eubanks in his research mentioned that at the end of the day, candidates are looking for a more personalized experience, and yet recruiters and employers are struggling to keep pace with hiring needs on a global scale. The Lighthouse Research 'Talent acquisition priorities' study has consistently found that talent acquisition leaders are focused heavily on improving their relationship with the business and improving their practice, but the primary areas of hands-on recruiting that they want to fix are onboarding and sourcing. Sourcing technical talent remains one of the most pressing concerns, and scaling recruitment efforts internationally presents additional hurdles. Many global employers lack confidence in handling foreign compliance regulations, and managing international employees requires considerable time and resources, reducing HR's overall efficiency and impact.

Traditionally, HR has cantered on managing people, but today's rapidly evolving workplace requires expertise in data analysis and AI. AI-driven solutions provide HR professionals with valuable insights for workforce planning, talent acquisition, and performance optimization. With many HR leaders struggling to manage change and employee fatigue, AI helps identify necessary adjustments and measure their effectiveness. However, a significant percentage of HR leaders remain uncertain about how AI will shape talent management in the future. AI's integration into HR practices can bridge these gaps, enabling organizations to enhance efficiency, strategic decision-making, and overall workforce development.

This study highlights that AI is still in the early stages of adoption in recruitment, mainly used for pre-selection and candidate communication. But study still pertains to have scope for an exploration of AI's potential in deeper recruitment functions like bias reduction, cultural fit assessment, and long-term candidate success prediction. Additionally, scope of ethical concerns and data privacy issues in AI-driven recruitment also needs to be studied well with the emerging trends of AI.

The integration of Artificial Intelligence (AI) in Human Resource Management (HRM) is revolutionizing traditional HR functions by automating processes, improving efficiency, and enabling strategic workforce management. Guenole and Feinzig (n.d.) emphasize the transformative impact of AI across various HR functions, including succession planning, recruitment, employee engagement, grievance handling, and HR analytics. Their study highlights how AI-driven automation facilitates data collection, analysis, and reporting, allowing HR professionals to focus on high-value strategic decision-making rather than

administrative tasks.

One of the key insights from their research is AI's role in talent management. AI-powered tools can efficiently identify high-potential employees, assess their skills, and design personalized development plans that align with both individual career growth and organizational objectives. This level of personalization enhances workforce planning by ensuring that employees are prepared for leadership roles, thereby strengthening internal mobility and retention rates.

The study also underscores the importance of AI in adapting to shifting market demands. Through AI-driven analytics, HR departments can anticipate emerging skill gaps and proactively develop targeted training programs. This adaptability is crucial in today's rapidly evolving business environment, where organizations must continuously upskill their workforce to remain competitive.

Another critical aspect explored by Guenole and Feinzig is the psychological dimension of AI in HR. Employees increasingly expect personalized attention and tailored experiences throughout their professional journey. AI meets these expectations by offering customized learning experiences, engagement strategies, and feedback mechanisms. Additionally, with platforms such as Glassdoor providing transparency into workplace cultures, organizations are under greater pressure to enhance employee experience, which AI can help optimize through sentiment analysis and continuous feedback loops.

Despite these advancements, challenges remain. Ethical concerns such as data privacy, algorithmic bias, and transparency must be addressed to ensure responsible AI implementation. The study suggests that while AI significantly enhances HR functions, organizations must balance technology adoption with ethical considerations to create a fair and inclusive work environment.

In conclusion, the findings of Guenole and Feinzig's research illustrate that AI is not merely an efficiency-enhancing tool but a strategic enabler of workforce development. By leveraging AI for talent acquisition, employee engagement, and skill development, HR professionals can drive organizational growth while ensuring a more personalized and data-driven approach to human resource management.

In the research paper by Jennifer Johansson and Senja Herranen Tutor: Brian McCauley Date: May 2019, they highlighted how AI is transforming recruitment within Human Resource Management (HRM) due to rapid technological advancements and globalization. As businesses strive to stay competitive, leveraging AI in hiring processes has become essential. The study explores how AI can be integrated into traditional recruitment methods to

improve efficiency and effectiveness.

The research, conducted through qualitative interviews with global companies, found that AI adoption in recruitment is still in its early stages. While not all companies use AI extensively, the most effective applications include automating pre-selection processes, communicating with candidates, and managing recruitment results. AI enhances recruitment by improving speed and efficiency while reducing repetitive tasks. However, a key challenge remains—many organizations are not yet fully prepared to adopt AI technologies in their hiring processes. This study examines the role of AI in onboarding, diversity & inclusion (D&I), work engagement, emotional intelligence, and employee mental health.

While the study proposes a conceptual model, it lacks empirical validation of AI's effectiveness in these areas. There is also limited discussion on the challenges of AI implementation in HRM, such as organizational resistance, data security concerns, and ethical considerations.

In the research paper, Artificial Intelligence in Human Resource Management: Recent Trends and Research Agenda by Akansha Mer (2023), she explores the impact of AI on HRM, especially in the wake of challenges posed by the COVID-19 pandemic. The study highlights AI's potential to reduce costs, lower attrition rates, and improve productivity within organizations. Given the limited research on the recent trends in AI-driven HRM, the study aims to provide insights into how AI enhances onboarding, diversity and inclusion (D&I), work engagement, emotional intelligence, and employee mental health.

Mer adopts a systematic review and meta-synthesis approach, analysing existing literature to identify key themes. The study particularly focuses on how AI-driven technologies such as natural language processing (NLP), big data, machine learning, and predictive analysis contribute to various HR functions.

Objectives of the study :

This research paper aims to explore the role of Artificial Intelligence (AI) in Human Resource Management (HRM) by examining its applications, benefits, challenges, and future implications. The key objectives of the study are:

1. To analyse the impact of AI on HR functions – Examine how AI-driven tools are transforming recruitment, talent acquisition, performance management, employee engagement, workforce analytics, and other HR processes.
2. To assess the effectiveness of AI in decision-making – Evaluate how AI enhances accuracy, efficiency, and data-driven decision-making in HRM, leading to improved workforce planning and strategic HR initiatives.

3. To explore the role of AI in reducing biases and enhancing diversity – Investigate how AI-powered recruitment and selection processes can minimize biases while promoting diversity and inclusion in the workplace.
4. To identify ethical and legal challenges in AI-driven HRM – Discuss concerns such as data privacy, algorithmic bias, transparency, and the need for human oversight in AI-driven HR operations.
5. To examine the role of AI in improving employee experience and retention – Assess how AI applications such as chatbots, predictive analytics, and personalized training programs contribute to employee engagement, satisfaction, and retention strategies.
6. To evaluate organizational readiness for AI adoption in HRM – Identify the challenges organizations face in integrating AI into HRM, including infrastructure, workforce adaptability, and change management strategies.

Summary of Key Findings :

The research identifies several ways AI is transforming HRM:

1. **Onboarding:** AI-driven NLP and robotics streamline the onboarding process, making it more efficient and reducing administrative workload.
2. **Diversity and Inclusion (D&I):** AI-powered data analytics, predictive analysis, and machine learning help organizations implement fair hiring practices and promote workplace diversity.
3. **Employee Engagement:** AI tools, including NLP and data analytics, enhance work engagement by providing personalized insights and recommendations.
4. **Emotional Intelligence:** AI simulations and intelligent robots assist employees in developing emotional intelligence, improving workplace interactions and leadership capabilities.
5. **Employee Mental Health:** AI-powered chatbots, employee pulse surveys, wearable technology, and intelligent robots provide mental health support and monitor employee well-being.
6. **The study concludes that AI in HRM not only improves organizational performance** but also helps reduce costs and employee turnover. By leveraging AI, companies gain a competitive edge, enhancing both employee experience and operational efficiency.

Although AI can improve HR functions like succession planning, recruitment, employee engagement, and grievance handling, it does not explore how AI can be integrated with existing HR systems and how it affects employee trust and acceptance. Additionally, it lacks

insights on how small and medium enterprises (SMEs) can adopt AI in HRM cost-effectively. Human Resource Management (HRM), being the department responsible for maintaining discipline, has come a long way. The term HRM is fairly veritably new term for handling employees in an organization. It is still evolving and will keep on evolving to keep up with the changing world.

The evolution in HRM (Human Resource Management) is of very recent origin. It began revolving around the 1980s. During the ancient period, for a long time, goods were produced mainly by skilled craftsmen and artisans. They were responsible for handling all the processes, generating it, producing it, and finally dealing it.

The Unlocking the Value of Artificial Intelligence in Human Resource Management Through AI Capability Framework" by Soumyadeb Chowdhury and others (2022) explores the increasing adoption of AI in HRM and why many organizations have yet to fully realize its anticipated benefits. Their study systematically reviews literature from multiple disciplines, including International Business, Information Management, Operations Management, General Management, and HRM, to provide a comprehensive understanding of the organizational resources required to develop AI capability in HRM.

Key Findings :

The authors argue that AI implementation in HRM requires more than just technical resources. While many organizations focus on the technological aspects, the study emphasizes the importance of non-technical factors, such as:

a. Human Skills and Competencies: Employees need training to work alongside AI and leverage its capabilities effectively.
b. Leadership and Team Coordination: Strong leadership and well-coordinated teams help integrate AI into HR functions.
c. Organizational Culture and Innovation Mindset: A culture that embraces innovation and AI-driven change is crucial for success.
d. Governance Strategy: Clear policies and ethical considerations must be in place for AI deployment.
e. AI-Employee Integration Strategies: Ensuring that AI complements human efforts rather than replacing them is key to maximizing benefits.
f. Contributions and Implications
g. The study introduces an AI Capability Framework, integrating the Resource-Based View (RBV) and Knowledge-Based View (KBV) theories, to guide organizations in developing the necessary resources for AI adoption. The framework serves as a tool

for businesses to self-assess their AI readiness and create strategies for implementing AI in HRM.

h. From a practical standpoint, the research offers a structured approach for HR managers to optimize AI-driven HR practices while ensuring a balance between technological advancements and human workforce development.

i. From the review of the study made above, AI Capability Framework has been described and also identified the need for non-technical resources like leadership, team coordination, and organizational culture for successful AI adoption in HRM.

Though this study focuses on organizational readiness, it does not address how companies at different maturity levels (startups vs. large corporations) should tailor their AI adoption strategies. Moreover, the paper does not delve into the ethical implications and risks associated with AI-driven HR practices

Ethical and Legal Challenges in AI Recruitment :

The integration of Artificial Intelligence (AI) in recruitment has significantly transformed the hiring process by improving efficiency, reducing time-to-hire, and enabling data-driven decision-making. However, AI recruitment also presents several ethical and legal challenges that organizations must navigate carefully.

1. Ethical Challenges :

1. Bias and Discrimination :

- AI algorithms are trained on historical data, which may contain inherent biases. If the training data reflects past discriminatory hiring practices, AI can perpetuate and even amplify these biases.
- Examples include gender or racial bias in resume screening or AI favoring candidates from certain backgrounds due to past hiring trends.

2. Lack of Transparency (Black Box Problem) :

- Many AI models operate as "black boxes," meaning HR professionals and candidates may not fully understand how hiring decisions are made.
- Lack of transparency raises concerns about accountability when AI rejects or selects candidates without clear explanations.

3. Privacy and Data Protection :

- AI-driven recruitment relies on vast amounts of personal data, including resumes, social media profiles, and behavioral assessments.
- Ethical concerns arise regarding how this data is collected, stored, and used, especially without explicit candidate consent.

4. Human Oversight and Accountability :

- AI should support HR decisions, not replace human judgment entirely. Over-reliance on AI can lead to unfair hiring decisions, especially in nuanced cases requiring human intuition.
- Organizations must ensure a balance between automation and human involvement in decision-making.

5. Job Displacement and Ethical Use of AI :

- Automation in recruitment may reduce the need for human recruiters, raising concerns about job losses in the HR sector.
- Ethical dilemmas arise regarding the extent to which AI should replace human roles in the hiring process.

2. Legal Challenges :

1. Compliance with Anti-Discrimination Laws :

- Many countries have laws prohibiting hiring discrimination, such as:
  - Title VII of the Civil Rights Act (USA) – Protects candidates from discrimination based on race, gender, religion, etc.
  - General Data Protection Regulation (GDPR - EU) – Ensures data protection and privacy rights for job applicants.
- If AI systems unintentionally discriminate, organizations could face legal consequences and reputational damage.

2. Data Privacy and GDPR Compliance :

- AI recruitment must comply with data protection laws such as GDPR and the California Consumer Privacy Act (CCPA), which regulate the collection, processing, and storage of personal data.
- Organizations must ensure transparency, obtain informed consent, and allow candidates to request data deletion.

3. Liability and Accountability :

- If an AI system makes a discriminatory or unfair hiring decision, it is unclear whether the responsibility lies with the employer, AI developer, or data provider.
- Legal frameworks are still evolving to address AI-related liability issues in HR.

4. Informed Consent and Fair Hiring Practices :

- Candidates may not always be aware that AI is making hiring decisions.
- Employers must disclose AI usage in recruitment, ensuring fair hiring practices and giving applicants the right to challenge AI-driven decisions.

General Research Gaps Across All Studies :

- Lack of empirical studies validating AI's impact on HRM outcomes.
- Limited exploration of ethical and legal concerns regarding AI in HR, such as bias, transparency, and data privacy.
- Absence of guidelines for SMEs to adopt AI in HRM, as most studies focus on large organizations.
- Need for more interdisciplinary research combining AI, psychology, and organizational behavior to understand AI's effect on employee satisfaction and trust.
- Lack of frameworks for AI integration with existing HR technologies and human-centric approaches to AI adoption.

These research gaps indicate the need for further studies to explore AI's role in HRM from multiple perspectives, including ethical, practical, and strategic implementation challenges.

Conclusion :

Artificial Intelligence (AI) is significantly reshaping Human Resource Management (HRM) by improving efficiency, data-driven decision-making, and overall employee experiences. AI-powered tools are streamlining various HR functions, including talent acquisition, performance management, employee engagement, and workforce analytics. By automating repetitive tasks, AI enables HR professionals to focus on strategic initiatives that enhance workplace productivity and employee satisfaction.

Despite these advancements, several challenges must be addressed to ensure the responsible and effective adoption of AI in HRM. Ethical concerns, such as bias in AI algorithms, data privacy issues, and the potential loss of human touch in HR processes, require careful consideration. Moreover, the legal landscape surrounding AI in HRM is evolving, necessitating compliance with data protection regulations and fair hiring practices. Organizations must implement AI with transparency, fairness, and human oversight to prevent unintended consequences and maintain trust among employees.

Strategic AI adoption can be a key driver of workforce transformation and organizational success. Companies that embrace AI responsibly can optimize HR operations, improve decision-making accuracy, and foster a more inclusive and engaging workplace. However, AI should not replace human judgment but rather complement HR professionals by providing insights that enhance decision-making.

Future research should delve deeper into several critical areas, including AI ethics, employee perceptions of AI-driven HR processes, and long-term AI-HR integration strategies. Understanding how employees view AI interventions in HRM will help organizations design

AI solutions that are both effective and well-accepted. Additionally, research on ethical AI frameworks and regulatory developments will be essential to guide responsible AI implementation. Finally, exploring best practices for long-term AI integration will help organizations achieve sustainable HR transformation while ensuring a balance between automation and human interaction.

By addressing these challenges and opportunities, AI has the potential to revolutionize HRM, making it more data-driven, efficient, and employee-centric. Organizations that strategically implement AI while upholding ethical standards will be well-positioned to gain a competitive advantage in the evolving workplace landscape.

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A Comparative Study of Supply Chain Management Strategy and Artificial Intelligence in Supply Chain Management

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Abstract : The purpose of this research is to explore the relationship between supply chain management strategy and chain management practices on supply chain performance. The main tools of data collection instrument used was a questionnaire which was administrated to a total sample of 200 managers are classified by job title and respondents are also classified by their job functions are corporate executive, purchasing, manufacturing/production, distribution/logistic, SCM, transportation, material, and operation from Malaysia manufacturing industry. The response rate was 62% while 51% was usable questionnaires. Sample selection was based on convenience sampling. The data were analyzed using mean, standard deviation and correlation between independent and dependent variables. This article presents a systematic literature review (SLR) of empirical studies concerning Artificial Intelligence (AI) in the field of Supply Chain Management (SCM). Over the past decade, technologies belonging to AI have developed rapidly, reaching a sufficient level of maturity to catalyze transformative changes in business and society. Within the SCM community, there are high expectations about disruptive impacts on current practices. However, this is not the first instance where AI has sparked business excitement, often falling short of the hype. It is thus important to examine both opportunities and challenges emerging from its actual implementation. Our analysis clarifies the current technological approaches and application areas, while expounding research themes around four key categories: data and system requirements, technology deployment processes, (inter)organiza- tional integration, and performance implications. We also present the contextual factors identified in the liter- ature. This review lays a solid foundation for future research on AI in SCM. By exclusively

considering empirical contributions, our analysis minimizes the current buzz and underscores relevant opportunities for future studies intersecting AI, organizations, and supply chains (SCs). Our effort is also meant to consolidate existing research insights for a managerial audience.

The analyses involved statistical methods such as reliability and validity tests and multiple regressions. The finding showed that supply chain management practices have a significant relationship with supply chain performance statically. However, supply chain management strategy is a weak predictor of supply chain management performance

Keywords: *Supply chain management Stragy, supply chain management practices, AI supply chain management performance, manufacturing firms.*

Introduction :

Supply chain has become an important focus of competitive advantage for organization business. The management of supply chain study emphasizes how to maximize the overall value of the firm by better using and deployment of resources across the whole of the firm. A supply chain is the set of values- adding activities connecting the enterprise's suppliers and its customers. The principle of supply chain activity is receiving input from firm's suppliers – add value – deliver to customers (Levi at al (2004). A supply chain encompasses all the parties that involved, directly or indirectly, in fulfilling a customer request. The supply chain includes manufacturer, suppliers, transporters, warehouses, retailers and even customers themselves. Within each organization, such as a manufacturer, the supply chain includes all function involved in receiving and filling a customer request. These functions includes new product development, marketing, operation, distribution, finance, customer service and other function that related to serving customer request (Chopra and Meindl, 2007). Effective supply chain management is important to build and sustain competitive advantage in product and services of the firms. Gunasekaran and Ngai,(2004); Sufian (2010) stated that the performance of supply chain was influenced by managing and integrating key element of information into their supply chain. To achieve effective supply chain integration, the firms need to implement information technology (Handfield and Nichols,2021); Sufian (2021). Brandyberry et al. (2020) suggested that by using technology of information, the firms could managing the flow and impact of numerous supply chains dimension, such as quality, cost, flexibility, delivery, and profit. Byrd and Davidson (2023) found that information technology impact the supply chain effectiveness. They stated that the development and long-term utilization of information technology lead to better firm performance in terms of return on

investment (ROI, return on equity (ROI) and market share. Vickery et al. (2023) showed that supply chain coordination and integration is facilitated by using integrated information technology, which directly impacts a financial performance of the firms. According to Sufian (2020) to achieve a competitive advantage and better performance, supply chain management strategy need support the business strategy.

Whereas there is little doubt that the technology has taken a great leap forward thanks to hardware innovation and cloud-based access, it is also true that introducing AI in real-life contexts is still challenging with implications that are still largely unknown. This is not only because of unsolved technical issues, but also due to the complexities of socio-technical systems requiring alignment of practices and process innovation. When considering SCM applications, such complexities are even more daunting due to (inter)functional and (inter) organizational dependencies coupled with cross-level integration within inherently open systems. In this sense, whereas the future speaks of autonomy and data-driven optimization of production and buyer-supplier, reality is that companies today are just experimenting with and mostly piloting AI amid the confusion and roadblocks that have been documented by recent surveys. Similar messages come from empirical AI-re- lated research in other disciplines.

Against growing calls on theorizing on the disruptive impact of AI in SCM, the purpose of this paper is to tamper potentially inflated expectations around the technology while still highlighting major discontinuities that are emerging. Indeed, a solid understanding of the current state of AI in SCM is important to develop and elaborate theory in a context that is likely characterized by fashion waves and managerial hypes. To this end, the article presents a systematic literature review of empirical studies published in peer-reviewed journals. The choice was motivated by the need to exclude unsubstantiated narratives, anecdotical evidence, and ensure that the insights were derived from studies developed under rigorous standards. In selecting the scope of our review, we embraced a broad definition of SCM, encompassing the management of flows within a firm (i.e., production and related operations) and between independent organizations (i.e., suppliers, buyers, final customers This rather ample angle was balanced with a focus on the manufacturing industry, so that we could report findings from a literature developed in contexts characterized by similar challenges and opportunities. Indeed, prior studies underline significant differences for example in healthcare, humanitarian, and energy.

The purpose of this study to find out the effect of supply chain management strategy such as lean supply chain, agile supply chain, and hybrid supply chain on supply chain performance.

This study also investigates the effect of supply chain management practices in terms of strategic supplier partnership, customer relationship and information sharing on supply chain performance. The paper is organized as follows. Relevant literature is reviewed and synthesized first to develop a conceptual model, followed by research methodology. The results are then presented along with discussion. Conclusion and implication are discussed finally.

Literature Review and Hypotheses :

The research objectives in this study were designed to investigate the effect of supply chain management strategy on supply chain performance and to determine whether supply chain management practices has impact on supply chain performance. Within these objectives, there are three concepts that needed to be explored to obtain an understanding of these objectives. These concepts are (1) supply chain management strategy that encompasses lean supply chain, agile supply chain and hybrid supply chain, (2) supply chain management practices that includes supplier partnership, customer relationship and information sharing (3) supply chain performance in terms of supply chain integration, supply chain flexibility, and customer responsiveness.

Supply chain management has been becoming increasingly important in competitive business. To compete at the supply chain level, firms must adopt an appropriate supply chain management strategy. The strategy needs integrate and coordinate throughout the supply chain to generate the performance of supply chain members. Mason-Jones et al. (2021) and Lewicka (2022) argued that supply chains need to adopt a strategy that suits both their particular product and marketplace. Fisher (2020) suggested that the first step in developing the supply chain strategy is to consider the nature of the demand for an organization's product, proposing that these are either functional or innovative.

Vonderembse et al. (2019) discussed three types of supply chains that are necessary to match three types of products: standard, innovative, and hybrid. They demonstrate that standard products, which tend to be simple products with limited amounts of differentiation, should be produced by a lean supply chain. Lean supply chain employ continuous improvement efforts and focus on eliminating wastes across the supply chain. On the other hand, innovative products which may employ new and complex technology require an agile supply chain. Agile supply chain responds to rapidly changing global markets by being dynamic and flexible across organizations. Hybrid products, which are complex products, have many components and participating companies in the supply chain; therefore, a variety of supplier relationships may be needed, which they refer to hybrid supply chains. Hybrid supply chains

combine the capabilities of lean and agile supply chains to meet the needs of complex products. Towill and Christopher (2002) suggest that there are three types of supply chain strategies: agile supply chains; lean supply chains; and hybrid supply chains. In their study, a case study was provided to show how a lean and agile supply chain can be successfully combined to have a lean/agile supply chain strategy which they refer to as "hybrid" or "leagile" supply chain. Naylor et al. (2019) uses the term "legality" as an integration of lean and agile paradigms with the aid of a decoupling point in the supply chain. Thus, they provide a personal computer company as a case study to demonstrate how agility and leanness can be combined successfully within the supply chain to meet customers' requirements.

The traditional domain of the information systems strategy is to improve the efficiency and effectiveness of organizations (Bakos and Treacy, 1986 cited in Sufian, 2019). Earl (2000; Sufian, 2022) argued that the information sharing strategy should originate from the business strategy. This means that information technology should facilitate implementing the business strategy (whatever that business strategy is) and help achieve its goals.

Supply chain management practices encompasses set of approaches and practices that effectively integrate with suppliers, manufactures, distributors, and customers to improve the long-term business performance and their supply chain (Chopra and Meindl, 2007; Tseng 2010). In this study, supply chain management practices are defined as several of management activities that purposed to improve the supply chain performance (Li et al., 2006; Wong et al., 2005; Zhou and Benton, 2007; Koh et al., 2007; Sufian, 2010).

Strategic supplier partnerships need better coordination between the organization and its suppliers; companies tend to have a long-term relationship with suppliers that create value. In this study, a strategic supplier partnership is defined as the long term relationship between the organization and its suppliers which influences the strategic and operational capabilities of individual participating companies to help them achieve significant ongoing benefits (Li et al., 2005; Li et al., 2006; Monczka et al., 1998). A strategic supplier partnership include buying goods and services from suppliers and impacting the suppliers system and operational capabilities, adding value and improving the supply chain performance (Monczka et al., 1998' Sufian, 2010).

Li et al. (2006) stated that customer relationship is the entire array of practices that are employed for the purpose of managing customer complaints, building long-term relationships with customers, and improving customer satisfaction. Vickery et al. (2003) emphasize the importance of establishing a close customer relationship as a major practice of supply chain

integration to enable organizations to respond faster to customers. Li et al. (2005) emphasize the importance of information sharing to SCM practice. The main principle of SCM is sharing of information within supply chains (Moberg et al., 2002). By sharing information with members of the supply chain, an organization can respond more quickly to the customer's changing needs (Li and Lin, 2006).

Supply chain integration is degree of all the activities within an organization, suppliers, and customers are integrated together (Stevens, 1990; Stock et al., 1998; Stock et al., 2000; Narasimhan and Jayaram, 1998). Supply chain integration involves effective communication among all supply chain members (Turner, 1993). Customer responsiveness is directly connected to information, in which suitable use of information is important to achieve customer responsiveness. To support this argument, Daugherty et al. (1995) found that information availability and customer responsiveness are positively related which resulted in improving firm performance. The need for flexibility originates from customers; since customers ask for variety, quality, competitive prices, and faster delivery. This has forced companies to make design changes quickly and respond faster to customer needs in order to sustain the company's competitive advantage. As a result, companies need to be flexible enough to react to changes in customers demands (Aggarwal, 1997).

Objectives of the study :

1. To study the comparative of Supply Chain Management Strategy.
2. To evaluate usage of supply chain strategy and AI SCM in various functions of large scale and small scale Industries.
3. To study of Artificial Intelligence in Supply Chain Management at various level.
4. To study of supply chain management practices areas and strategic supplier partnership
5. To find out benefits of comparative study Supply Chain Strategy and AI SCM.

This study examines the supply chain management strategy that consists of lean supply chain, agile supply chain, and hybrid supply chain and its relationship to supply chain performance. Hence, the following hypotheses will be tested:

- H1: Supply chain management strategy is positively related to supply chain performance H1a: Supply chain management strategy is positively related to supply chain integration

- H1b: Supply chain management strategy is positively related to supply chain flexibility
- H1c: Supply chain management strategy is positively related to customer responsiveness

We proposed that supply chain management practices that consist of strategic supplier partnership, customer relationship and information sharing and its relationship to competitive advantage of the firm. Hence, the following hypotheses will be tested:

- H2: Supply chain management practices is positively related to supply chain performance
- H2a: Supply chain management practices is positively related to supply chain integration
- H2b: Supply chain management practices is positively related to supply chain flexibility
- H2c: Supply chain management practices is positively related to customer responsiveness

Understanding AI and business analytics :

Definition of AI :

AI refers to the simulation of human intelligence processes by computer systems, encompassing learning, reasoning, and self-correction. Specifically, AI systems can acquire information and rules for using it, apply logical deduction to solve problems, and improve their performance through experience (Russell & Norvig, 2016).

AI is often categorized into two main types: narrow AI and general AI. Narrow AI, also known as weak AI, is designed to perform specific tasks, such as facial recognition, language translation, or playing chess, effectively mimicking human capabilities in those areas (Bengio et al., 2017). In contrast, general AI, or strong AI, aspires to possess the ability to understand, learn, and apply intelligence across a broad range of tasks, similar to human cognitive abilities (Goertzel & Pennachin, 2007).

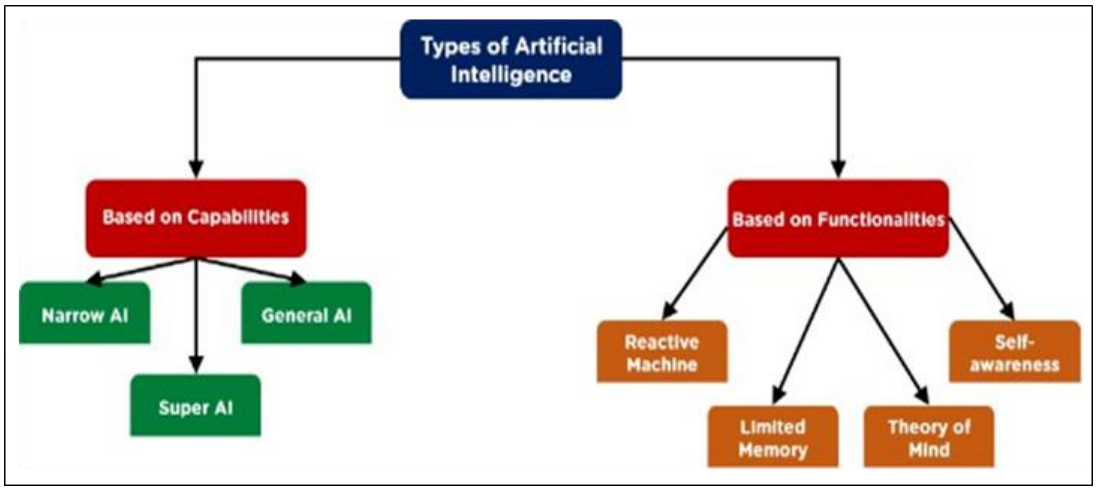

Figure 1 Types of AI and Categories [7]

AI technologies leverage various techniques, including ML, where algorithms improve their performance based on past data, and deep learning, which utilizes neural networks to analyse complex data patterns (LeCun et al., 2015). The application of AI spans numerous fields, from healthcare and finance to entertainment and transportation. By automating routine tasks, enhancing decision-making processes, and providing predictive insights, AI has become a crucial tool for businesses seeking efficiency and innovation.

Types of AI in Analytics :

AI encompasses various techniques and methodologies that are utilized in analytics to derive insights from data. The three prominent types of AI in analytics include Machine Learning, Natural Language Processing, and Predictive Analytics.

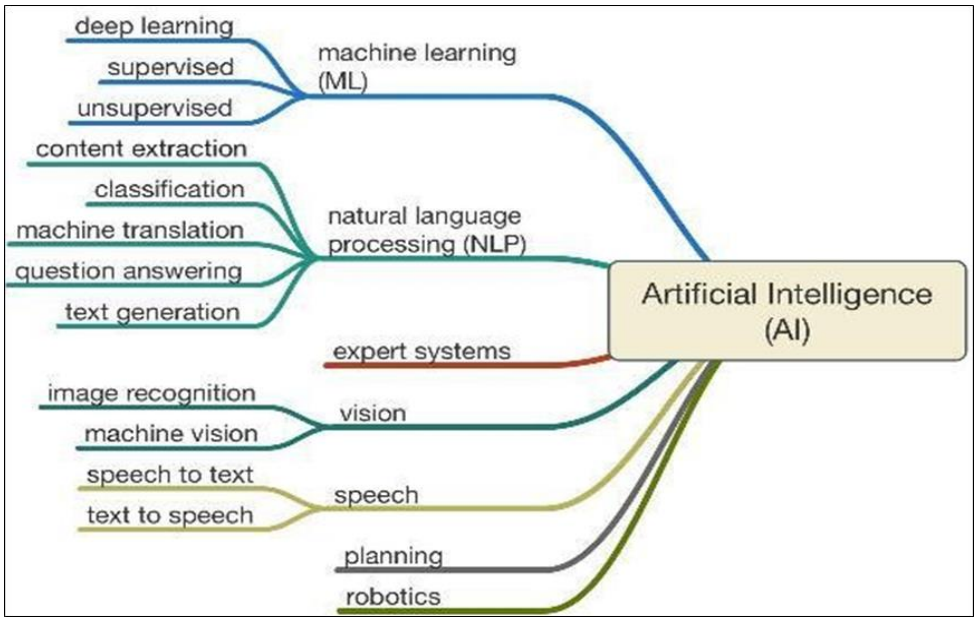

Figure 2 Broader Concept of AI [7]

- **Machine Learning :** ML is a subset of AI that enables systems to learn from data, identify patterns, and make decisions with minimal human intervention. ML algorithms use statistical techniques to analyse historical data and build models that can predict outcomes or classify data points. In analytics, ML is widely used for tasks such as customer segmentation, fraud detection, and recommendation systems (Jordan & Mitchell, 2015). The power of ML lies in its ability to continuously improve as it processes more data, enhancing the accuracy and effectiveness of predictions and decisions over time.
- **Natural Language Processing :** Natural Language Processing (NLP) is another critical component of AI that focuses on the interaction between computers and humans through natural language. NLP enables machines to understand, interpret, and generate human language, allowing for the analysis of unstructured data such as text and speech. In analytics, NLP is used to analyse customer feedback, social media sentiments, and other textual data sources to gain insights into consumer behaviour and preferences (Manning et al., 2014). This capability facilitates more nuanced and comprehensive analyses, enhancing decision-making processes.
- **Predictive Analytics :** Predictive Analytics leverages statistical algorithms and machine learning techniques to analyse historical data and forecast future outcomes. By identifying trends, correlations, and patterns, organizations can make informed decisions based on predicted future scenarios. This type of analytics is invaluable in various domains, including finance for risk assessment, marketing for campaign effectiveness, and healthcare for patient outcomes (Shmueli & Koppius, 2011). Predictive analytics empowers businesses to proactively address potential challenges and seize opportunities, ultimately driving strategic growth.

Importance of Analytics in Business : Analytics has become a cornerstone of modern business strategy, providing organizations with the tools and insights necessary to make informed decisions, optimize operations, and enhance customer experiences. The importance of analytics in business can be summarized in several key areas.

- Data-Driven Decision Making: Analytics empowers organizations to make decisions based on data rather than intuition or speculation. By analysing historical data, businesses can identify trends, understand customer behaviour, and evaluate the effectiveness of past strategies (Davenport & Harris, 2017). This data-driven approach

reduces uncertainty and increases the likelihood of making successful decisions that align with market demands.

- Operational Efficiency: By utilizing analytics, businesses can streamline operations and improve efficiency. Through process analysis and performance measurement, organizations can identify bottlenecks, reduce waste, and optimize resource allocation (Kumar & Reinartz, 2016). For example, supply chain analytics can help companies forecast demand accurately, ensuring that inventory levels are aligned with customer needs, thus minimizing excess stock and associated costs.
- Enhanced Customer Experience: Analytics provides valuable insights into customer preferences and behaviours, allowing businesses to tailor their products and services accordingly. By leveraging customer data, organizations can personalize marketing campaigns, improve customer service, and develop products that resonate with their target audience (Chen et al., 2012). This focus on customer-centric strategies not only increases customer satisfaction but also fosters loyalty and repeat business.
- Competitive Advantage: In today's fast-paced market, organizations that leverage analytics can gain a significant competitive edge. By understanding market trends and customer preferences ahead of their competitors, businesses can innovate and adapt more quickly, positioning themselves as industry leaders (Marr, 2016).

Thus, analytics is vital for business success, enabling data-driven decision-making, enhancing operational efficiency, improving customer experience, and providing a competitive advantage in a dynamic marketplace.

Research Methodology :

Sampling and Data Collection :

The data collection instrument used was a questionnaire which was administrated to a total sample of 200 managers are classified by job title and respondents are also classified by their job functions are corporate executive, purchasing, manufacturing/production, distribution/logistic, SCM, transportation, material, and operation from Malaysia manufacturing industry.

Reliability Analysis :

The Cronbach's alpha was conducted to assess the reliability of each scale. Alpha values over 0.7 indicate that all scales can be considered reliable (Nunally, 1978). For each of the item scales, factor analysis was used to reduce the total number of items to manageable factor. Principal components analysis is used to extract factors with eignevalue greater than

1.Varimax rotation is used to facilitate interpretation of the factor matrix. Sampling adequacy measurement tests are also examined via the Kaiser-Meyer-Olkin statistics to validate use of factor analysis Factors analysis showed that the KMO value of 0.81 indicate sampling adequacy. The factor model indicates three distinct factors loading without any misclassification: lean supply chain, agile supply chain, and hybrid supply chain. Cronbach's alphas among 20 items in the questionnaires exceeded 0.7. Seven items are identified for Lean supply chain (LSC), eight items are identified for agile supply chain (ASC), and five items for Hybrid supply chain (HSC). These items are treated as independent variables.

A similar factor analysis was applied to the supply chain management practices areas: strategic supplier partnership (SSP), customer relationship (CR) and information sharing (IS). Among 23 items in the questionnaire, five items are deleted during the factor analysis. A total of 23 items were reduced to seven underlying factors loadings, depicted in Table 2. Cronbach's alphas among 18 items in the questionnaires are exceeded 0.7. Six items are identified for strategic supplier partnership (SSP), five items for customer relationship (CR) and, seven items for information sharing (IS). These items are also treated as independent variables. The KMO value of 0.78 indicate sampling adequacy.

Factor analysis was also applied to the supply chain performance: supply chain integration (SCI), supply chain flexibility (SCF) and responsiveness customer (RC). Among 18 items in the questionnaire, six items are deleted during the factor analysis. A total of 12 items were reduced to six underlying factors loadings, depicted in Table 2. Cronbach's alphas among 18 items in the questionnaires are exceeded 0.7. Six items are identified for strategic supplier partnership (SSP), five items for responsive customer (RC) and, seven items for information sharing (IS). These items are treated as independent variables. The KMO value of 0.72 indicate sampling adequacy

Correlation Analysis :

The correlation between independent variables (supply chain strategy and management practices) and dependent variables (supply chain performance) were positive. Lean supply chain had a correlation of 0.243, $p<0.01$ with supply chain integration, 0.232, $p<0.01$ supply chain flexibility, 0.241, $p<0.01$ responsive customers. Which mean that the respondents are more likely to evaluate lean supply chain was positive when supply chain performance is positive. Agile supply chain had a correlation of 0.225, $p<0.05$ supply chain integration, 0.281, $p<0.05$ supply chain flexibility, 0.266, $p<0.05$ responsive customer. Hybrid supply chain has a correlation of 0.282, $p<0.01$ with supply chain integration, 0.287, $p<0.01$ supply chain flexibility, 0.335, $p<0.01$ responsive customers.

Regression analysis :

The parameters of this model are estimated using multivariate regression analysis. Table 1 shows coefficients of each model along with corresponding test statistics. In Model 1 where the dependent variable is overall supply chain performance, the model seem to be reliable (p-value for F<0.01 and adjusted R-square of 0.130. Model 2, dependent variable is supply chain integration. The model also seem to be reliable (p-value for F<0.01 and adjusted R-square of 0.199. Strategic supplier partnership, customer relationship and information sharing are the important determinant in supply chain integration with p- value for t<0.01, followed by agile supply chain with p-value of t<0.05, lean supply chain and hybrid supply chain are not significant with p-value of t>0.05. Model 3, dependent variable is supply chain flexibility. Once again, the model also seem to be reliable (p-value for F<0.01), and adjusted R-square of 0.185. Strategic supplier partnership, customer relationship and information sharing are important determinant in supply chain flexibility with p-value for t<0.01, followed by agile supply chain with p- value of t<0.05, while lean supply chain and hybrid supply chain are not significant with p-value of t>0.05. Model 4, dependent variable is customer responsiveness. The model seem to be reliable (p-value for F<0.01). and adjusted R-square of 0.163. It appears, strategic supplier partnership and customer relationship has similar effect on the customer responsive. Followed by agile supply chain and information sharing with p-value for t<0.05 while lean supply chain hybrid supply chain are not significant with p-value of t>0.05.

Table 1 Model parameter estimates of supply chain orientation (t- Value in parenthesis)

	Model 1	Model 2	Model 3	Model 4
	Dependent variable = overall SC performance	Dependent variable = SCI	Dependent variable = SCF	Dependent variable = RC
Constant	126.31	21.188	17.244	16.294
	(7.422)**	(7.095)**	(5.812)**	(6.481)**
LSC	1.031	0.119	0.127	0.130
	(1.589)*	(1.062)	(1.142)	(1.183)
ASC	0.749 (2.065)*	0.216 (2.256)*	0.162 (2.102)*	0.170 (2.186)*
HSC	1.031	0.119	0.117	0.110
	(1.989)*	(1.072)	(1.172)	(1.193)

SSP	0.847 (3.054)**	0.216 (3.247)**	0.183 (3.111)**	0.191 (3.185)**
RC	1.221 (3.789)**	0.129 (3.172)**	0.127 (3.171)**	0.122 (2.993)**
IS	1.642 (3.531)**	0.265 (3.280)**	0.242 (2.801)**	0.163 (2.095)*
Adj R2	0.130	0.199	0.185	0.163
F-alue	11.243**	11.040**	7.643**	6.469**

***p value <0.05, **p value <0.01**

Results :

In this research, the following outcomes were obtained: The correlation analysis showed that lean supply chain is not related to supply chain integration, supply chain performance and customer responsiveness. Agile supply chain is related to supply chain integration, supply chain flexibility and customer responsiveness. Hybrid supply chain is not related to all supply chain performance. The research also found that strategic supplier partnership, customer relationship and information sharing are the important determinant of supply chain performance.

For hypothesis 1a investigate the relationship between supply chain management strategy and supply chain integration, this study found that not significant correlation between supply chain strategy and supply chain performance. Hypothesis 1b assessed the relationship between supply chain management strategy and supply chain flexibility. Finding show there is a weak relationship between supply chain management strategy and supply chain performance. Hypothesis 1c examine the relationship between supply chain management strategy and customer responsiveness and testing found that there is a weak relationship between supply chain management strategy and customer responsiveness. Hypothesis 2a considered the correlation between supply chain management practices and supply chain integration. According to the result shown that there is significant relationship supply chain management practices and supply chain integration. Hypothesis 2b assessed the relationship between supply chain management practices and supply chain flexibility. Finding show that also significant correlation between supply chain management practices and supply chain flexibility. Hypothesis 2c investigates the relationship between supply chain management practices and customer responsiveness. Finding also show that there is a significant relationship between independent and dependent variables.

Discussion and implications :

The most important factor that faced by organizations is implement the strategy to organizational practices. Research findings show that supply chain management strategy is

the weak relationship to supply chain performance (refer to Table 5). Although supply chain management strategy is the weak of the two predictors (supply chain strategy and supply chain management practices) of supply chain performance, firms should take note that supply chain management strategy is important factors and being impact supply chain performance. However, the strategic that has been formulated by top management should be implemented in organizational practices. To effectively managing the supply chain,organizations need to adopt appropriate supply chain strategies into supply management chain practices (Sufian, 2010). Effective supply chain management is critical determinant to building and sustaining competitive advantage in the market place.

This study also showed that the strong predictor of supply chain performance are strategic supplier partnership, customer relationship and information sharing (refer to Table 5). It should be noted that the supply chain management strategy that not implemented into supply chain management practices can not generate the supply chain performance. The research finding shows that in order to do so, there is a need to integrate supply chain management strategy into supply chain management practices.

Based on the data collected from 200 corporate executives, purchasing managers, manufacturing managers, logistic managers and operation managers from Malaysia manufacturing industry, the research hypotheses are tested by using multiple regression models. The result of this study may be contributes to the supply chain management knowledge in several ways. This study was to add to the knowledge on supply chain management performance by exploring the relationship supply chain management strategy, supply chain practices and supply chain management performance. By developing and testing a research framework of supply chain management strategy and practices constructs and conducting an analysis a number of manufacturing firms with valid and reliable instrument, this study represented one of the investigate the relationship supply chain management strategy, supply chain management practices and supply chain performance. Overall, this study contributes to the knowledge of the role of supply chain management strategy and practices in supply chain management field. First, it proposed a theoretical supply chain management strategy framework that identified lean supply chain, agile supply chain and hybrid supply chain. Second, this study provides a practical and useful tool for supply chain managers to audit and assess supply chain performance practices. For instance, the supply chain management practices can be used to evaluate the extent to which organizational performance practices have been implemented, and their impact on the competitive capability of the firm. Third, this study provides conceptual and prescriptive literature regarding supply

chain management strategy and practices. Fourth, the results lend support to the claim that higher level of supply chain management practices lead to higher levels of supply chain performance.

The Role of AI in Shaping Business Strategy :

AI has emerged as a transformative force that reshapes how businesses operate and develop their strategies. By integrating AI technologies, organizations can enhance decision-making, streamline operations, and drive innovation. This section explores how AI is shaping business strategy across various dimensions, including data-driven insights, enhanced customer experiences, operational efficiency, and competitive advantage.

- Data-Driven Insights: AI enables businesses to analyse vast amounts of data quickly and accurately, uncovering insights that drive strategic decision-making. Predictive analytics, powered by machine learning algorithms, allows organizations to forecast trends and behaviours, enabling them to proactively respond to market changes (Davenport & Ronanki, 2018). For instance, retailers can use AI to analyse consumer purchasing patterns and optimize inventory management, ensuring that products are available when and where they are needed. This data-driven approach minimizes waste and enhances profitability, making it a cornerstone of modern business strategy.
- Enhanced Customer Experiences: In today's competitive landscape, delivering exceptional customer experiences is vital for business success. AI plays a crucial role in personalizing interactions and improving customer engagement. Through natural language processing (NLP) and machine learning, companies can analyse customer feedback, preferences, and behaviours to tailor their offerings (Lemon & Verhoef, 2016). AI- powered chatbots, for example, provide instant support and personalized recommendations, enhancing customer satisfaction and loyalty. By leveraging AI to understand and anticipate customer needs, businesses can differentiate themselves in a crowded marketplace.
- Operational Efficiency: AI technologies significantly enhance operational efficiency by automating routine tasks and optimizing processes. Robotic process automation (RPA) streamlines repetitive tasks, allowing employees to focus on higher-value activities that require creativity and critical thinking (Lacity et al., 2015). Additionally, AI algorithms can analyse supply chain logistics in real time, identifying bottlenecks and optimizing resource allocation. By reducing operational

costs and improving productivity, AI empowers organizations to allocate resources more effectively and maintain a competitive edge.

- Competitive Advantage: Incorporating AI into business strategy can provide a significant competitive advantage. Companies that harness AI technologies can innovate more rapidly, adapt to market changes, and respond to customer demands more effectively than their competitors. For instance, organizations using AI for real-time market analysis can pivot their strategies quickly, staying ahead of industry trends. Furthermore, the ability to leverage AI for personalized marketing campaigns enhances brand loyalty and drives revenue growth.

Conclusion :

a. Summary of Key Points :

This paper has explored the transformative impact of emerging technologies, particularly artificial intelligence (AI), on business strategy and operations. Several key points have emerged from this analysis, illustrating the significance of AI in shaping modern enterprises.

- Role of AI in Decision-Making: AI has revolutionized decision-making processes by providing data-driven insights that allow organizations to make informed choices. Through predictive analytics and machine learning, businesses can forecast trends, customer behaviour, and market dynamics, enabling proactive strategies that enhance competitive advantage. This shift towards data-centric decision-making fosters agility and responsiveness in a rapidly changing business environment.
- Enhancing Customer Experiences: Personalization and customer engagement have become essential components of business success. AI technologies, such as natural language processing and machine learning, facilitate the analysis of customer preferences and behaviours, allowing organizations to tailor their offerings effectively. The implementation of AI-powered tools, such as chatbots and recommendation engines, significantly improves customer interactions and satisfaction, fostering long-term loyalty.
- Operational Efficiency and Automation: The integration of AI into business operations streamlines processes and increases efficiency. Robotic process automation (RPA) reduces the burden of routine tasks, enabling employees to focus on strategic initiatives that require human insight and creativity. Furthermore, AI optimizes supply chain management and resource allocation, leading to cost reductions and improved productivity.

- Competitive Advantage through Innovation: Embracing AI technologies allows organizations to innovate rapidly and respond to market demands more effectively than their competitors. Companies leveraging AI for real-time market analysis and personalized marketing can stay ahead of industry trends, driving growth and profitability.

In summary, the incorporation of AI into business strategy offers substantial benefits, including enhanced decision- making, improved customer experiences, operational efficiency, and a competitive edge in the marketplace. As businesses continue to navigate the complexities of the modern landscape, leveraging these technologies will be crucial for sustained success and innovation.

Final Thoughts on the Future of AI in Decision Making :

As we look to the future, the role of AI in decision-making will continue to expand and evolve. The increasing volume of data generated across various sectors necessitates advanced analytical tools that can sift through information quickly and extract actionable insights. AI technologies, particularly machine learning and predictive analytics, will enhance organizations' ability to make data-driven decisions, allowing them to remain agile and competitive in rapidly changing markets.

Moreover, the integration of AI into decision-making processes is likely to foster a more collaborative environment, where human intuition and expertise complement machine intelligence. This hybrid approach will empower businesses to leverage the strengths of both AI and human judgment, ultimately leading to more informed and nuanced decisions.

Ethical considerations will also play a critical role in the future of AI in decision-making. Organizations must prioritize transparency, fairness, and accountability to build trust among stakeholders. By addressing these ethical dimensions, businesses can harness AI's full potential while ensuring that their decision-making processes align with societal values.

In conclusion, the future of AI in decision-making promises to unlock new opportunities for innovation and growth, provided that organizations navigate the accompanying challenges responsibly and ethically.

- Compliance with ethical standards
- Disclosure of conflict of interest
- No conflict of interest to be disclosed.

Limitation and future research :

There are a number of limitations that influence the generalizability of this study. First, this study limited only on manufacturing industry. One of the limitations of this single-sector study is that the conclusions may not be generalizable to other sectors. Future studies replicating this research across multiple industries and sector would increase the understanding of supply chain performance. Second, the sample selection was based on a convenience sample, which is often used for exploratory work (Zikmund, 2003), rather than a random probability sample. Additional research could be conducted using a random probability sample. Third, the sample represented a limited number of companies in limited industry. Fourth, the study is based on a self-reported questionnaire. Therefore, there is a possibility of respondents answering questions in a way that is perceived to be more desirable or acceptable than what is actually experienced or believed. Thus, the results of this study should be considered indicative rather than definitive based on these limitations.

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Sleep Patterns and Their Relationship with Academic Success: Evidence from Higher Education Students in Pune, India

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Abstract : This study, conducted in Pune, India, a demanding academic climate, investigates how sleep habits influence college students' academic success. Researchers analyze sleep timing (chronotype and regularity), quality (latency and disruptions), and duration. They assess academic performance using GPA and self-reported achievement. A cross-sectional survey of diverse undergraduate and graduate students provides a snapshot of this relationship.

The study reveals that poor sleep habits negatively impact academic performance, while adequate sleep equips students to manage academic demands effectively. The research demonstrates significant correlations between sleep characteristics and academic outcomes. Students with better sleep habits achieve higher academic success, emphasizing the crucial role of sufficient sleep in enhancing cognitive functions necessary for academic performance. This study enriches the existing understanding of sleep and academic performance in Indian higher education, and its findings will inform the development of interventions to promote better sleep and enhance student success.

Keywords: *Sleep patterns, academic success, higher education, Pune, India, sleep duration, sleep quality, GP*

Introduction :

Sleep is essential for regulating emotions, enhancing cognitive function, and maintaining general well-being. It helps maintain mental well-being, strengthen memory, and solve problems. In higher education, where students face demanding academic standards, getting enough sleep is crucial for optimal learning, focus, and performance. A well-rested mind

enhances stress management, complex decision-making, and memory retention. However, despite its importance, students often struggle with sleep due to social obligations, part-time jobs, academic pressure, and irregular schedules.

College and university students often sacrifice sleep to complete assignments, prepare for tests, or participate in extracurricular activities. Widespread use of digital distractions, like social media and late-night screen time, significantly worsens sleep deprivation. Long-term sleep deprivation can impair judgment, reduce cognitive function, and make people more prone to anxiety and depression, all of which can have an impact on one's ability to succeed academically and in general quality of life.

Researchers have thoroughly investigated the association between sleep habits and academic performance in Western environments, where regulated schedules, campus services, and mental health awareness initiatives frequently address sleep-related problems. However, a dearth of research still exists on this topic in India, especially in places like Pune, which has a sizable and varied student body. Known as the "Oxford of the East," Pune draws students from all over the nation, creating a fiercely competitive and demanding academic atmosphere. The particular sociocultural and academic constraints in this area require a more thorough study of how sleep patterns affect students' academic performance.

Examining the effects of sleep duration, quality, and timing on academic performance is essential given the rising level of academic competition and the changing lifestyles of Indian students. In order to find trends and possible risk factors that lead to sleep problems, this study intends to investigate these associations among Pune's higher education students. The results of this study may aid in the creation of focused treatments, including time management techniques, awareness campaigns, and campus regulations that encourage improved sleep hygiene. In the end, encouraging better sleep habits in students can improve their general well-being, mental health, and academic performance, making their time as students more balanced and effective.

Objectives of Study :

- To analyze the relationship between sleep patterns and academic success in Pune's higher education students.
- To assess the impact of sleep timing on academic performance.
- To evaluate the influence of sleep quality on academic achievement.
- To determine the correlation between sleep duration and academic outcomes.

- To provide insights for interventions to improve student sleep and academic success in Pune.

Scope of Study :

- **Geographic Scope:** Students enrolled in higher education in Pune, India, are the exclusivefocus of this study.
- **Population Scope:** Undergraduate and graduate students enrolled in higher education institutions are the study's primary emphasis.
- **Variables:** The study looks at the connection between academic success (as determined by GPA and self-reported achievement) and sleep patterns, including timing, quality, and length of sleep.
- **Methodological Scope:** By using a cross-sectional survey design, the study offers a momentary view of the interaction.
- **Academic Scope:** The study only looks at how sleep affects academic performance; it does not explore other potential effects of sleep, like how it affects physical health.

Significance of Study :

- Contextual Relevance: By offering pertinent and localized insights, this study tackles a crucial issue within the demanding academic environment of Pune, India.
- Understanding Sleep's Role: It helps students in higher education better grasp how important getting enough sleep is for improving the cognitive processes required for academic success.
- The results enable the creation and implementation of interventions that improve children's sleep and academic performance.
- Contributing to Existing Literature: The study adds to the corpus of information already available on sleep habits and academic achievement, especially in the context of Indian higher education.
- Practical Implications: The study offers suggestions for how institutions, teachers, and students might encourage sound sleeping practices to enhance academic performance.

Literature Review :

Jahan Ara & Dr. Anajli Sahai Srivastava (2024) the study examined the connection between college students' academic achievement and sleep quality. The descriptive data revealed that while sleep quality varied considerably, academic performance remained unchanged.

Regression analysis indicated that sleep quality did not significantly predict academic achievement. Since the ANOVA findings did not reach the statistical significance threshold, the researchers accepted the null hypothesis that sleep quality has minimal impact on academic performance. Correlation analysis found a modest negative correlation (-0.08911), but it was not statistically significant. These results highlight the study's limitations and emphasize the need for further research with a larger sample size, suggesting that factors other than sleep quality likely influence academic performance.

Abdullah D. Alotaibi et al (2020) This study found that preclinical medical students experienced poor sleep quality and high-stress levels, with a strong connection between the two factors. Additionally, stress and daytime naps significantly contributed to poor sleep quality. Women were more likely to experience stress. The research showed no statistically significant link between academic achievement and stress levels or sleep quality. To support students' well-being and academic success, researchers and medical educators should continue evaluating teaching strategies and factors affecting performance while promoting better sleep quality through counseling and educational campaigns.

Abigail Anna George et al (2024) this study found that poor sleep quality significantly increased mental exhaustion among college students. Personal responsibilities, social commitments, and academic stress were the main causes of sleep disturbances, which worsened mental fatigue. The research highlighted the importance of adequate sleep in maintaining mental clarity and productivity. Students can reduce fatigue by establishing healthy sleep habits, including maintaining a consistent sleep schedule, avoiding caffeine before bed, and exercising regularly. Prioritizing sleep hygiene is essential for fostering a healthier student body, as it enhances academic performance, overall well-being, and long-term resilience.

Salva Feyza Najwa Zaferina(2024), This study found that online gaming contributed to physical health issues—such as exhaustion, sleep disorders, and inactivity—among vocational students at the University of Indonesia. While most students recognized these negative effects, some struggled to control their gaming time. The research highlights the need to raise awareness about the physical health risks of excessive gaming. Universities should improve campus sports facilities; provide counseling for students struggling with gaming addiction, and implement educational programs on time management and responsible technology use. Further research with larger sample sizes and long-term studies is necessary to gain deeper insights into the health impacts of online gaming.

Shu Hui Cheng (2012) this study examined the prevalence and risk factors for poor sleep quality among 4,318 new university students in Taiwan. The results showed that 54.7% of students had poor sleep quality, as indicated by a Pittsburgh Sleep Quality Index (PSQI) score of 6 or higher. Multivariate logistic regression analysis identified several key risk factors, including being a female undergraduate student, skipping breakfast, drinking tea, experiencing internet addiction, lacking social support, exhibiting high neuroticism, and having elevated scores on the Chinese Health Questionnaire (CHQ-12). Universities should focus on identifying the causes of poor sleep and implementing strategies to improve students' sleep health.

Fahmi Hassan Fadhel & Nabil Saleh Sufyan(2022) This study found high rates of poor sleep quality and sleep difficulties among university students in Yemen and Saudi Arabia. Sleep quality and difficulties strongly correlated with academic performance among Saudi students but showed no significant link among Yemeni students earned excellent or very good grades experienced less sleep problems than those who received lower academic averages.. . The findings highlight the importance of quality sleep for academic success. Adequate rest enables university students to perform well in their studies. Therefore, we must urgently implement psychological interventions to improve sleep quality and academic performance. Additionally, researchers should conduct further studies on this subject.

Md Moyazzem Hossain & Md Habibur Rahman (2019) showed that Students who perform poorly in school have issues with their sleep and need medical guidance to maintain a healthier lifestyle, which includes getting enough sleep. As a comprehensive strategy, evaluation of sleep quality may also be included in yearly student health examinations. University healthcare service providers should teach students about sleep health and motivate them to improve it by focusing on behaviors that strengthen sleep hygiene, according to this study.

Balan Rathakrishnan(2021) Specifically, they did not account for the negative impact of clinically poor sleep quality on academic performance in non-depressed students, a finding previously reported by Gilbert and Weaver (2010). To find reasons, preventative strategies, and potential therapies, future studies should examine the connection between poor sleep quality and mental and physical health.

Sachin Gupta et al (2023) emphasized sleep length and nocturnal sleep disruptions as critical determinants of psychological well-being, this study sought to investigate the connection between college students' sleep habits and mental health. In a population that is predisposed to both sleep disorders and psychological difficulties, the results emphasize the link between

mental health and sleep quality. The study's use of the ASR to evaluate respondents' mental health was one of its main strengths. Future studies should examine whether students with generally healthy sleep habits can benefit psychologically from current sleep therapies and increase the quality of their sleep. Both college communities and individual students might greatly benefit from effective preventative measures.

Tria Angela Kusumaningrum et al (2024) study findings show that insufficient sleep significantly influences university students' mental health, particularly by increasing stress and anxiety levels. Students who sleep less than six hours nightly experience heightened stress and anxiety, which negatively affects their overall well-being. A heavy workload, pre-bedtime electronics use, and unsupportive sleeping arrangements deteriorate their sleep quality. Conversely, students who obtain adequate sleep feel more relaxed and can better manage academic demands.

Research Methodology :

This study adopts mixed-methods, descriptive, and cross-sectional research design to investigate the relationship between sleep patterns and academic success among higher education students in Pune, India. This approach allows for a comprehensive understanding of the phenomenon through both quantitative and qualitative data collection and analysis.

1. Research Design:

- The study describes students' sleep patterns and academic performance, offering a clear picture of the current situation.
- Researchers will collect data at a single point in time, capturing a snapshot of the relationship between sleep patterns and academic success
- The study combines both quantitative and qualitative methods. Researchers will gather quantitative data through structured questionnaires and obtain qualitative insights through open-ended questions or follow-up interviews.

2. Data Collection:

Primary Data:

- Researchers will use a structured questionnaire to gather primary data on sleep patterns (duration, quality, and timing), self-reported academic performance, and demographic information.
- The questionnaire will include items measured on a Likert scale (e.g., 5-point scale) to assess sleep quality, sleep habits, and self-reported academic achievement.

Secondary Data: The study will measure academic success by collecting Grade Point Average (GPA) data, either by obtaining it from student records (with proper consent) or by asking students to self-report it.

3. Instrument:

- The structured questionnaire will include established scales like the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality and the Morningness-Eveningness Questionnaire (MEQ) to assess chronotype.
- The study will use additional questions to collect data on sleep duration, sleep timing, and demographic information.
- The questionnaire will also include open-ended questions to gather qualitative data regarding student's perceived barriers to good sleep.

4. Sampling Method:

- The study will employ simple random sampling to choose participants from a roster of students across higher education institutions in Pune..
- The target population will include undergraduate and postgraduate students from diverse academic disciplines.
- The sample size will be determined using power analysis to ensure adequate statistical power.
- Sample Size-154

5. Data Analysis:

Quantitative Data:

- Data will be analyzed using SPSS version 25.
- The study will employ descriptive statistics (means, standard deviations, frequencies) to present a summary of the data.
- The study will employ descriptive statistics (means, standard deviations, frequencies) to present a summary of the data.
- Researchers will perform multiple regression analyses to determine how sleep patterns independently affect academic success while controlling for demographic variables.

Qualitative Data: The study will use thematic analysis to analyze qualitative data from open-ended questions and discover common themes and patterns regarding students' sleep challenges.

6. Ethical Considerations:

- Researchers will obtain ethical approval from the relevant institutional review board.
- Researchers will obtain informed consent from all participants before collecting data.
- Researchers will maintain participant confidentiality and anonymity throughout the study.
- Participants will participate voluntarily.

Results & Discussion

Sample Overview

Statistics

		What is your age?	What is your gender?	What is your qualification?	What is your stream of Education?
N	Valid	164	164	164	164
	Missing	0	0	0	0

What is your age?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Below 18 Years	13	7.9	7.9	7.9
	19 to 21 Years	61	37.2	37.2	45.1
	22 to 24 Tears	66	40.2	40.2	85.4
	Above 25 Years	24	14.6	14.6	100.0
	Total	164	100.0	100.0	

What is your gender?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Male	71	43.3	43.3	43.3
	Female	93	56.7	56.7	100.0
	Total	164	100.0	100.0	

What is your stream of Education?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Science	21	12.8	12.8	12.8
	Commerce	12	7.3	7.3	20.1
	Arts	28	17.1	17.1	37.2
	Engineering	34	20.7	20.7	57.9
	Management	60	36.6	36.6	94.5
	Others	9	5.5	5.5	100.0
	Total	164	100.0	100.0	

The survey includes 164 valid responses with no missing data across all variables (age, gender, education stream).

Age Distribution :

- The largest age group is 22-24 years (40.2%, 66 respondents)
- Followed by 19-21 years (37.2%, 61 respondents)
- Above 25 years (14.6%, 24 respondents)
- Below 18 years (7.9%, 13 respondents)
- Overall, the sample is predominantly young adults, with 77.4% between 19-24 years old

Gender Distribution :

- Female respondents make up the majority (56.7%, 93 respondents)
- Male respondents account for 43.3% (71 respondents)
- The gender distribution shows a slight female skew

Educational Background :

- Management is the most common educational stream (36.6%, 60 respondents)
- Engineering ranks second (20.7%, 34 respondents)
- Arts follows at 17.1% (28 respondents)
- Science accounts for 12.8% (21 respondents)
- Commerce has the smallest specific representation (7.3%, 12 respondents)
- "Others" make up 5.5% (9 respondents)

Interpretation :

1. This appears to be a survey of primarily college/university students or recent graduates given the age concentration
2. Management and Engineering students represent over half the sample (57.3%)
3. The moderate gender imbalance might influence results depending on the survey's focus
4. The underrepresentation of Commerce students might impact conclusions related to business or financial topics

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Average weekly study hours?	164	1	2	1.32	.467
How many hours of sleep do you typically get on a weekday?	164	1	4	2.91	.713
How many hours of sleep do you typically get on weekends?	164	3	4	3.80	.402
What time do you typically go to sleep on weekdays?	164	1	4	2.82	.948

How long (in minutes) has it taken you to fall asleep each night?	164	1	4	1.78	.784
During the past month, how would you rate your sleep quality overall?	164	1	4	2.41	.733
What time do you typically wake up on weekdays?	164	1	4	3.07	.788
What is your age?	164	1	4	2.62	.832
What is your gender?	164	0	1	.57	.497
Valid N (list wise)	164				

The table shows sleep-related data from a survey of 164 respondents. Here's my **interpretation:**

1. **Study Hours:** On average, respondents study 1.32 hours weekly (standard deviation 0.467). The range is narrow (1-2 hours), suggesting most students study similar amounts.
2. **Weekday Sleep:** Respondents get an average of 2.91 hours of sleep on weekdays (standard deviation 0.713). This is concerning as it is significantly below the recommended 7-9 hours for adults. The range (1-4 hours) indicates some variation, but overall sleep duration appears inadequate.
3. **Weekend Sleep:** Weekend sleep averages 3.80 hours (standard deviation 0.402). While higher than weekdays, this is still well below healthy levels. The narrow range (3-4 hours) shows consistent but insufficient sleep patterns.
4. **Weekday Bedtime:** The mean score is 2.82 (standard deviation 0.948). Without knowing what the 1-4 scale represents in terms of actual times
5. **Time to Fall Asleep:** Respondents take an average of 1.78 units (likely representing time ranges) to fall asleep (standard deviation 0.784). The range (1-4) suggests some respondents fall asleep quickly while others experience delays.
6. **Sleep Quality:** Average rating is 2.41 on a 4-point scale (standard deviation 0.733). This suggests moderate sleep quality, though the context for this scale would help with interpretation.
7. **Weekday Wake Time:** Average score is 3.07 (standard deviation 0.788). Like bedtime, specific interpretation requires knowing what the 1-4 scale represents.

Overall, this data suggests concerning sleep patterns among respondents, particularly the very low sleep duration on both weekdays and weekends. The consistency across respondents (relatively low standard deviations) indicates this may be a widespread issue within this population

Logistic Regression :

Case Processing Summary

Unweighted Cases[a]		N	Percent
Selected Cases	Included in Analysis	164	100.0
	Missing Cases	0	.0
	Total	164	100.0
Unselected Cases		0	.0
Total		164	100.0

a. If weight is in effect, see the classification table for the total number of cases.

Dependent Variable Encoding

Original Value	Internal Value
Male	0
Female	1

Classification Table[a,b]

			Predicted		
			What is your gender?		
	Observed		Male	Female	Percentage Correct
Step 0	What is your gender?	Male	0	71	.0
		Female	0	93	100.0
	Overall Percentage				56.7

a. Constant is included in the model.

b. The cut value is .500

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 0	Constant	.270	.158	2.933	1	.087	1.310

Variables not in the Equation

			Score	df	Sig.
Step 0	Variables	Would you be interested in learning more about strategies to improve sleep for better cognitive and emotional health?	5.419	1	.020
		Have you tried to change your sleep habits to improve sleep quality? If yes, what changes have you made?	13.060	1	.000
		Do you practice any relaxation techniques (e.g., meditation, deep breathing) before bedtime?	2.966	1	.085

		Do you have a consistent bedtime routine (e.g., winding down before bed)?	4.670	1	.031
	Overall Statistics		17.697	4	.001

Block 1: Method = Enter

Omnibus Tests of Model Coefficients

		Chi-square	df	Sig.
Step 1	Step	18.852	4	.001
	Block	18.852	4	.001
	Model	18.852	4	.001

Model Summary

Step	-2 Log likelihood	Cox & Snell R Square	Nagelkerke R Square
1	205.540[a]	.109	.146

a. Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Hosmer and Lemeshow Test

Step	Chi-square	df	Sig.
1	13.945	8	.083

Contingency Table for Hosmer and Lemeshow Test

		What is your gender? = Male		What is your gender? = Female		
		Observed	Expected	Observed	Expected	Total
Step 1	1	9	10.395	6	4.605	15
	2	6	3.544	0	2.456	6
	3	15	12.203	6	8.797	21
	4	10	14.060	15	10.940	25
	5	3	2.797	3	3.203	6
	6	9	10.943	18	16.057	27
	7	6	6.446	12	11.554	18
	8	10	6.424	12	15.576	22
	9	3	2.859	9	9.141	12
	10	0	1.328	12	10.672	12

Variables in the Equation

		B	S.E.	Wald	df	Sig.	Exp(B)
Step 1[a]	Would you be interested in learning more about strategies to improve sleep for better cognitive and emotional health?	.463	.454	1.038	1	.308	1.588
	Have you tried to change your sleep habits to improve sleep quality? If yes, what changes have you made?	1.213	.360	11.384	1	.001	3.364

	Do you practice any relaxation techniques (e.g., meditation, deep breathing) before bedtime?	.502	.332	2.294	1	.130	1.652
	Do you have a consistent bedtime routine (e.g., winding down before bed)?	-.076	.301	.064	1	.800	.926
	Constant	-.753	.343	4.832	1	.028	.471

a. Variable(s) entered on step 1: Would you be interested in learning more about strategies to improve sleep for better cognitive and emotional health?, Have you tried to change your sleep habits to improve sleep quality? If yes, what changes have you made?, Do you practice any relaxation techniques (e.g., meditation, deep breathing) before bedtime?, Do you have a consistent bedtime routine (e.g., winding down before bed)?.

Researchers focused their analysis on predicting gender (Male/Female) from sleep-related behavior questions, using a complete dataset of 164 participants.

Baseline Information :

- The dependent variable is gender, coded as Male (0) and Female (1)
- In the initial step (Step 0), the model correctly classified 56.7% of cases without any predictors
- There were 71 males and 93 females in the sample (56.7% female)

Model Significance :

- The overall logistic regression model is statistically significant (Chi-square = 18.852, df = 4, p = .001)
- The Hosmer and Lemeshow test shows adequate fit (p = .083, which is > .05)

Model Fit Statistics :

- Cox & Snell R Square = .109 and Nagelkerke R Square = .146, suggesting that the model explains between 10.9% and 14.6% of the variance in gender
- This indicates a modest effect size

Significant Predictors :

Looking at the Variables in the Equation table:

1. Most Significant Predictor: "Have you tried to change your sleep habits to improve sleep quality?" (B = 1.213, Wald = 11.384, p = .001, Exp(B) = 3.364)

- This is the only statistically significant predictor in the model

- The odds ratio (Exp(B)) of 3.364 means that those who have tried to change their sleep habits are approximately 3.36 times more likely to be female than male

2. Non-significant Predictors:

- Interest in learning about sleep strategies (p = .308)
- Practice of relaxation techniques (p = .130)
- Having a consistent bedtime routine (p = .800)

Interpretation :

1. The strongest finding is that females are significantly more likely than males to report having tried to change their sleep habits to improve sleep quality.

2. While the following variables showed initial association with gender (in the "Variables not in the Equation" table in Step 0), they did not remain significant when controlling for other factors:

- Interest in learning about sleep strategies
- Practice of relaxation techniques
- Having a consistent bedtime routine

3. The model has modest predictive power (14.6% at best according to Nagelkerke R Square), suggesting that while sleep habit modification behavior differs by gender; there are many other factors not in the model that influence gender differences.

Practical Implications :

If developing sleep interventions or education:

- Women appear more likely to have already attempted to change sleep habits
- There were no significant gender differences in interest in learning more about sleep strategies, practicing relaxation techniques, or having consistent bedtime routines
- Interventions targeting men might need to address barriers to attempting sleep habit changes

Findings :

- **Study Hours:** Respondents dedicate an average of 1.32 hours per week to studying, with minimal variation (1-2 hours). This suggests a consistent but limited study duration across participants.

- **Weekday Sleep:** The average sleep duration on weekdays is 2.91 hours, significantly below the recommended 7-9 hours. The standard deviation of 0.713 and a range of 1-4 hours indicate some variation but generally inadequate sleep.
- **Weekend Sleep:** Respondents sleep slightly more on weekends, averaging 3.80 hours. However, this remains far below healthy sleep levels. The narrow range (3-4 hours) implies uniform sleep deprivation.
- **Weekday Bedtime:** The mean score is 2.82, but without scale context, interpretation is limited. The standard deviation of 0.948 suggests some variability in bedtime routines.
- **Time to Fall Asleep:** Respondents take an average of 1.78 units to fall asleep, with a standard deviation of 0.784. The range (1-4) indicates that while some fall asleep quickly, others experience delays.
- **Sleep Quality:** An average sleep quality rating of 2.41 (out of 4) indicates moderate sleep, with a standard deviation of 0.733 showing some variation in perceived sleep quality.
- **Weekday Wake Time:** The average score is 3.07 (standard deviation 0.788), but without clarity on scale interpretation, deeper insights are limited.
- The strongest finding is that females are significantly more likely than males to report having tried to change their sleep habits to improve sleep quality.
- While the following variables showed initial association with gender (in the "Variables not in the Equation" table in Step 0), they did not remain significant when controlling for other factors:
- Interest in learning about sleep strategies Practice of relaxation techniques Having a consistent bedtime routine The model has modest predictive power (14.6% at best according to Nagelkerke R Square), suggesting that while sleep habit modification behavior differs by gender; there are many other factors not in the model that influence gender differences.
- Practical Implications If developing sleep interventions or education: Women appear more likely to have already attempted to change sleep habits There were no significant gender differences in interest in learning more about sleep strategies, practicing relaxation techniques, or having consistent bedtime routines Interventions targeting men might need to address barriers to attempting sleep habit changes.

Recommendations:

- **Improve Sleep Duration:** Given the extremely low sleep hours, respondents should aim for better time management, balancing study, work, and leisure to allow at least 7 hours of sleep per night.
- **Enhance Sleep Hygiene:** Implementing strategies like reducing screen time before bed, creating a consistent sleep schedule, and improving sleeping conditions can help enhance both sleep duration and quality.
- **Educational Awareness:** Conduct workshops or awareness programs to highlight the importance of sufficient sleep for cognitive function, health, and overall well-being.
- **Time Management Training:** Providing guidance on effective time management may help respondents allocate adequate time for studying without compromising their sleep.
- **Further Investigation:** Additional research with clearer scale definitions could provide deeper insights into respondents' bedtime and wake-up behaviors.
- **Awareness Programs:** Implementing educational initiatives to raise awareness about the importance of sleep, its impact on health and performance, and strategies for improving sleep hygiene.
- **Sleep Hygiene Improvements:** Promoting healthy sleep habits such as maintaining a consistent sleep schedule, creating a relaxing bedtime routine, optimizing sleep environment, and avoiding stimulants before bedtime.
- **Time Management Strategies:** Encouraging effective time management techniques to prioritize tasks, reduce stress, and allocate sufficient time for sleep.
- **Campus Services:** Providing access to campus services such as counseling, health centers, and wellness programs to support students in addressing sleep-related issues and promoting overall well-being.

Conclusion :

This study reveals a noteworthy trend of sleep deprivation among the respondents, with both weekday and weekend sleep durations falling significantly below recommended levels. The consistency in sleep duration, indicated by the low standard deviations, suggests that this is a pervasive issue affecting a large portion of the population, rather than isolated cases. While the reported sleep quality is moderate, the overall insufficiency in sleep hours is likely to have detrimental effects on various aspects of their lives.

Potential Impacts:

- **Academic performance :** sleep consistently impairs cognitive function, reduces concentration, and hinders information retention, which leads to decreased academic performance, lower grades, and a hindered overall learning potential.
- **Health:** Chronic sleep deprivation can contribute to a range of health problems, including a weakened immune system, increased risk of cardiovascular diseases, metabolic disorders, and mental health issues such as anxiety and depression.
- **Well-being:** Inadequate sleep causes daytime fatigue, irritability, mood swings, and decreased motivation, which negatively influences overall well-being and affects personal and professional relationships, as well as the ability to enjoy daily activities. By addressing these issues through a combination of education, behavioral changes, and support services, it is possible to foster healthier sleep patterns among the respondents, leading to improvements in their academic performance, health, and overall quality of life

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The Fintech Challenge: Assessing Commercial Banks' Vulnerabilities and Opportunities

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Abstract: Commercial banks in particular have been greatly impacted by the quick advancement of information technology. Fintech can assist commercial banks in this process by enhancing service effectiveness, developing new business models, and lowering operating expenses. But it has also presented difficulties for commercial banks' conventional operations. The emergence of fintech will make the banking sector more competitive, increase the cost of interest payments for banks, and decrease their profitability, all of which will increase bank risk. The impact of fintech on commercial banks and the issues that arise during the process are examined in this article, which also offers recommendations and solutions for the growth of commercial banks.

Keywords: *FinTech, Internet businesses, commercial banks, Online Banking, Credit services*

Introduction :

The term "fintech," which refers to financial innovation that depends on technology and includes new products and services, technological applications, and business models that alter financial products, was first defined by the Financial Stability Board (FSB) in 2016. and services, financial institutions, and financial markets; it includes back-end technologies as well as front-end financial industries. FinTech has emerged as a key driver and source for identifying new financial needs and services as well as generating social wealth. FinTech is a fundamental innovation that fundamentally alters the financial system's infrastructure.

In order to meet the preferences of financial service demanders and raise the marginal utility level of financial consumers, FinTech offers workable technological solutions for financial innovation, providing more intelligent and cost-effective financial services that are not time- or location-limited. The traditional financial sector will unavoidably be impacted in a number of ways by the emergence of fintech. Commercial banks, the backbone of the financial system, are the organizations most impacted by fintech in addition to being representatives of the conventional financial sector. This essay will examine fintech's effects on commercial banks from both a positive and a negative standpoint, and then offer recommendations for

how these banks can advance.

Objectives of the study:

- To analyze the impact of fintech on commercial banks.
- To evaluate the risks and vulnerabilities that fintech introduces to commercial banks.

Fintech's Beneficial Impact on Commercial Banks :

1. Increasing the Effectiveness of Commercial Bank Services :

According to Philippon, fintech can increase the financial sector's efficiency. Fintech also improves commercial banks' service efficiency, and its implementation is favorable to enhancing both the effectiveness and quality of commercial banks' services. Commercial banks can use fintech to collect customer data through big data analysis, facilitating customer profiling for tailored product offerings and focused advertising. This strategy improves marketing effectiveness while lowering operating expenses. By increasing the banks' online resources, lowering the cost of computing services, and improving the availability and dependability of IT resources, cloud computing providers can help commercial banks become more capable and efficient in serving their clientele.

In addition to improving service efficiency and lowering errors through automated workflows, artificial intelligence can process vast volumes of data and assist banks in better understanding and utilizing it. Blockchain technology is still in its infancy, but its primary uses in the financial industry include supply chain finance, digital currencies, and notes. According to Lee and Shin, blockchain can enhance transaction security and lower transaction costs.

2. Encouraging Commercial Banks to Develop Innovative Business Models :

A number of commercial banks' operations have been significantly impacted by the financial technology industry's explosive growth. Commercial banks have started to consistently investigate new business models and development techniques in order to preserve their profitability and competitiveness. For instance, some banks have created models for the analysis of customer data in order to design new credit products. It is important to note that commercial banks and online businesses can collaborate. First off, when it comes to payments and transfers, this kind of collaboration can guarantee that money will reach clients promptly when they need it, improve the payment experience, and increase payment security.

Second, Internet businesses and commercial banks can collaborate to offer credit services to their clientele. For instance, online businesses can direct consumers to a commercial bank's lending division when they're buying a big item (like a house or a car), earning extra money

for both sides. Last but not least, commercial banks and Internet companies can improve data sharing, which helps with risk identification and customer experience improvement. To better understand consumer needs and offer pertinent services, commercial banks, for example, can receive customer data from Internet businesses.

3. Cutting Down on Commercial Banks' Operating Expenses :

Commercial banks' operating expenses can be decreased through the use of fintech. It lowers physical stores' operating expenses, to start. Approximately 60% of a bank's operating expenses are related to its operations. Financial technology can be used to make the majority of commercial banks' The bank can suitably cut the number of locations, lower the cost of opening new locations, and lower operating and maintenance expenses by moving business processing online. Second, it lowers the internal IT department's maintenance costs at the bank. The bank must spend a lot of money on human resources in the traditional mode in order to keep the IT operating environment stable, but cloud computing can help with the issue of the IT environment's unstable operation. Commercial banks can utilize cloud computing technology to increase service scalability and reliability while lowering IT costs because it can offer elastic computing and storage services. Third, fintech can assist with staff cost control.

For commercial banks, personnel costs have always been one of the biggest operating expenses. Fintech applications can allow businesses that were previously conducted offline to move online, which lowers the labor costs associated with the bank's physical locations. Additionally, many automated workflows and intelligent services can effectively replace manual services, resulting in labor cost savings.

Fintech's detrimental impacts on commercial banks :

1. Declining the Effectiveness of Commercial Bank Loans and Deposits :

The rapid rise of fintech in India has significantly reduced the effectiveness of commercial bank loans and deposits by offering faster, more flexible, and tech-driven financial solutions. Digital lending platforms like KreditBee, Navi, and Lendingkart provide instant, AI-driven loans with minimal paperwork, attracting customers away from traditional bank credit, while Buy Now, Pay Later (BNPL) services such as ZestMoney and LazyPay reduce the demand for credit cards and personal loans. Similarly, fintech-driven investments through platforms like Groww, Zerodha, and Upstox offer higher returns than bank deposits, leading to a decline in savings and fixed deposits (FDs) with commercial banks. Digital wallets and payment banks like Paytm, PhonePe, and Airtel Payments Bank further reduce the necessity for traditional bank accounts by providing seamless transaction and storage options. As a

result, banks face shrinking loan demand, lower deposit inflows, and declining profitability, forcing them to invest in digital transformation, enhance their mobile banking services, and collaborate with fintech firms to remain competitive in the evolving financial landscape.

2. Lowering the Non-Interest Revenue of Commercial Banks :

The emergence of fintech in India has significantly lowered the non-interest revenue of commercial banks by disrupting traditional fee-based services such as payments, remittances, wealth management, and credit card transactions. Digital wallets and UPI-based platforms like PhonePe, Google Pay, and Paytm have drastically reduced banks' earnings from transaction fees and fund transfers, as customers now prefer zero-cost, instant digital payments over traditional banking channels. Similarly, fintech-led investment platforms like Groww, Zerodha, and Upstox have taken over wealth management and brokerage services, reducing banks' income from mutual fund distribution and stock trading. The rise of Buy Now, Pay Later (BNPL) services and neo-banks has also challenged traditional banks' dominance in credit card fees and account maintenance charges. With fintech firms offering low-cost, customer-centric solutions, commercial banks are experiencing a decline in service fees, commissions, and other non-interest revenue streams, forcing them to rethink their business models and integrate fintech-driven innovations to sustain profitability.

Due to these factors, third-party payment services have a high level of customer loyalty, which puts commercial banks' non-interest revenue at risk.

Growing Hazards for Commercial Banks :

1. Technological Danger :

The growing reliance on technology in the banking sector has exposed commercial banks to significant technological dangers, including cybersecurity threats, data breaches, system failures, and fintech-induced competition. With the rapid expansion of digital banking, UPI transactions, and AI-driven financial services, banks face an increasing risk of hacking, phishing, ransomware attacks, and identity theft, as seen in multiple cyberattacks on Indian banks and fintech platforms. Additionally, the integration of third-party fintech solutions into banking ecosystems increases vulnerabilities, as weak cybersecurity measures in fintech firms can expose banks to fraud and unauthorized transactions. System failures and IT outages further pose operational risks, potentially disrupting core banking services and eroding customer trust. As fintech firms leverage advanced technologies like AI, blockchain, and cloud computing, traditional banks must heavily invest in cybersecurity, robust IT infrastructure, and regulatory compliance to mitigate technological hazards and sustain competitiveness in the digital financial landscape.

2. Information Hazard :

The increasing digitization of banking services has led to significant information hazards for commercial banks, primarily due to data breaches, misuse of customer information, regulatory non-compliance, and third-party vulnerabilities. With the rise of fintech partnerships, open banking, and AI-driven financial services, vast amounts of sensitive customer data are shared across multiple digital platforms, increasing the risk of unauthorized access, hacking, and identity theft. Cybercriminals exploit loopholes in banking and fintech networks, leading to fraud, phishing attacks, and financial losses for both banks and customers. Additionally, regulatory bodies like the RBI and SEBI have introduced stringent data protection guidelines, and failure to comply can result in heavy penalties, reputational damage, and loss of customer trust. The use of AI and big data analytics also raises ethical concerns regarding data privacy and consent, as banks and fintech firms leverage personal information for targeted financial products. To mitigate these risks, commercial banks must enhance cybersecurity measures, adopt stringent data governance policies, and ensure compliance with evolving data protection regulations to maintain trust and safeguard customer information.

3. Potential Hazard :

Commercial banks face numerous potential hazards in the rapidly evolving financial landscape, particularly due to the rise of fintech innovations, cybersecurity threats, regulatory challenges, and economic uncertainties. The increasing adoption of digital banking, AI-driven lending, and blockchain-based transactions has intensified competition from fintech firms, reducing banks' traditional revenue streams from loans, deposits, and transaction fees. Fintech platforms such as UPI, digital wallets, and Buy Now, Pay Later (BNPL) services have transformed customer preferences, shifting financial activities away from conventional banking channels. This disruption forces banks to invest heavily in digital transformation and technological upgrades, increasing operational costs while profitability declines. Additionally, the risk of disintermediation—where fintech firms provide financial services without involving banks—threatens the traditional banking model, leading to reduced customer engagement and retention.

Another major hazard for commercial banks is the growing cybersecurity and regulatory risks associated with digital banking. With the surge in online transactions and cloud-based banking solutions, banks are highly vulnerable to cyberattacks, fraud, phishing, and data breaches, which can result in financial losses and reputational damage. Regulatory bodies like the RBI and SEBI continue to impose stricter compliance requirements on data protection,

risk management, and anti-money laundering (AML) measures, increasing the compliance burden on banks. Failure to comply with these regulations can lead to hefty fines, operational restrictions, or even license revocations. Furthermore, economic uncertainties, inflation, and geopolitical risks impact the creditworthiness of borrowers, leading to higher non-performing assets (NPAs) and financial instability. To mitigate these hazards, commercial banks must focus on strengthening cybersecurity infrastructure, diversifying revenue streams, collaborating with fintech firms, and enhancing regulatory compliance to remain resilient in the face of evolving risks.

Commercial Bank Development Plans in the Fintech Environment :

1. Utilize Cutting-Edge Products to Raise Service Quality and Standards :

To stay competitive in the evolving fintech-driven financial landscape, commercial banks must utilize cutting-edge products to enhance service quality and operational standards. Integrating AI-powered chatbots, blockchain-based transactions, digital lending platforms, and data analytics-driven risk assessment can significantly improve efficiency, customer experience, and security. For example, AI-driven personalized banking services can offer tailored financial products, while robo-advisors help customers make informed investment decisions. Blockchain can enhance transparency and security in transactions, reducing fraud risks. Additionally, biometric authentication and AI-based fraud detection improve security and regulatory compliance. Banks can also collaborate with fintech firms to develop seamless digital payment solutions, instant loan approvals, and API-driven open banking services, enabling faster and more accessible financial transactions. By leveraging these advanced technologies, commercial banks can boost customer satisfaction, reduce operational costs, improve financial inclusion, and maintain a strong foothold in the competitive fintech environment.

2. Strengthen Collaboration with Fintech Companies :

To thrive in the rapidly evolving fintech environment, commercial banks must strengthen collaboration with fintech companies to enhance efficiency, innovation, and customer experience. Partnering with fintech firms allows banks to integrate advanced technologies like AI-driven credit assessment, blockchain-based security, and real-time payment processing, improving service delivery and operational efficiency. For instance, collaborations with UPI platforms, digital lending startups, and robo-advisory services enable banks to offer seamless digital transactions, faster loan approvals, and personalized investment solutions. By leveraging API-driven open banking, banks can expand their product offerings while maintaining compliance with regulatory frameworks like RBI's

digital banking guidelines. Moreover, fintech partnerships help banks reach underserved markets, such as rural areas and small businesses, by providing innovative financial solutions like Buy Now, Pay Later (BNPL), AI-based lending, and mobile banking. Strengthening these collaborations ensures that commercial banks stay competitive, drive financial inclusion, and maintain relevance in the digital financial ecosystem.

3. Encourage Fintech Talent :

To successfully navigate the fintech-driven banking environment, commercial banks must encourage fintech talent by investing in skilled professionals, digital upskilling, and innovation-driven work culture. Hiring experts in AI, blockchain, cybersecurity, and data analytics can help banks develop advanced financial solutions, such as AI-powered risk assessment, real-time fraud detection, and automated customer support. Additionally, banks should collaborate with fintech startups, universities, and tech incubators to foster innovation and attract top-tier talent. Offering fintech-focused training programs, digital banking certifications, and competitive compensation packages will help retain skilled professionals who can drive technological advancements. Moreover, creating fintech innovation labs within banks can encourage employees to experiment with new technologies and develop cutting-edge financial products. By actively promoting fintech talent, commercial banks can enhance digital transformation, improve service efficiency, and maintain a strong competitive edge in the evolving financial landscape.

Literature Review :

Several studies have explored the impact of fintech on the operations, competitiveness, and risk exposure of commercial banks. Chen et al. (2020) argue that fintech has disrupted traditional banking by introducing innovative payment systems, lending models, and digital wealth management solutions. They highlight that banks adopting fintech solutions experience improved efficiency and customer satisfaction but also face increased cybersecurity risks. Similarly, Zhang and Wang (2021) emphasize that fintech firms leverage artificial intelligence and blockchain technology to offer services that challenge traditional banking structures. Their research indicates that banks partnering with fintech companies benefit from enhanced data analytics and reduced operational costs, yet they also face regulatory uncertainties.

Another study by Lee et al. (2022) investigates the strategic responses of commercial banks to fintech innovations. Their findings suggest that banks that proactively integrate fintech solutions into their business models tend to gain a competitive advantage. However, they caution that such integration requires significant investment in digital infrastructure and

human capital. Furthermore, Sharma and Patel (2023) examine the regulatory and compliance challenges that arise when banks engage with fintech. They conclude that while regulatory sandboxes help banks experiment with new technologies, compliance costs remain a substantial burden.

Additionally, Kumar et al. (2023) assess the impact of fintech collaborations on bank profitability and customer experience. Their research shows that partnerships between banks and fintech firms lead to increased financial inclusion and improved loan processing times. However, they also note that banks risk losing market share to fintech disruptors if they fail to adapt quickly. Overall, these studies collectively indicate that while fintech presents growth opportunities for commercial banks, it also necessitates strategic adaptation and robust risk management frameworks.

Research Methodology :

This study employs a mixed-methods approach to analyze the exposure of commercial banks to fintech. A qualitative analysis is conducted through a systematic review of existing literature, identifying key themes related to fintech adoption, regulatory challenges, and risk management. Secondary data is gathered from academic journals, financial reports, and case studies of banks that have integrated fintech solutions.

Findings and Discussion :

The study reveals that commercial banks face significant exposure to the rise of fintech, impacting their market share, profitability, and operational models. Fintech firms, with their agility and technological innovations, challenge traditional banking by offering faster, cost-effective, and customer-centric financial services. Key findings indicate that commercial banks are vulnerable in areas such as digital payments, lending, and wealth management, where fintech companies have gained substantial traction. Additionally, cybersecurity risks and regulatory concerns add complexity to banks' adaptation strategies.

Despite these challenges, banks are responding by adopting digital transformation strategies, collaborating with fintech firms, and investing in advanced technologies like artificial intelligence and blockchain. Strategic partnerships and acquisitions of fintech startups have emerged as common approaches to mitigate risks and leverage technological advancements. Moreover, regulatory frameworks are evolving to ensure fair competition while maintaining financial stability.

The discussion highlights that while fintech poses disruption, it also offers opportunities for banks to innovate and improve customer experience. The ability of commercial banks to integrate fintech-driven solutions will determine their future competitiveness. In conclusion,

the study emphasizes the need for a balanced approach where banks embrace innovation while maintaining regulatory compliance and risk management practices.

Conclusion :

In summary, commercial banks benefit from the growth of fintech. It can lower operating costs, promote business model innovation, and increase service efficiency. However, it also has drawbacks, including risks pertaining to technology, information, and talent, as well as difficulties for commercial banks' loan, deposit, and intermediary operations. Commercial banks ought to take proactive measures and make use of fintech's capabilities in response to the threats and effects posed by these companies. On the one hand, they can work with fintech companies to advance both parties. However, they can also use their own resources to create fintech subsidiaries.

Commercial banks should also concentrate on developing fintech talent and streamlining the talent structure to guarantee a suitable ratio of new technology-oriented professionals to more established financial professionals. In conclusion, commercial banks must use fintech to continuously improve the standards, quality, and efficiency of their services. They ought to enhance their capacity to serve clients and develop financial products with a customer-centric approach.

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Data Privacy and Ethical Concerns in AI-Driven HR Process

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Abstract : The rapid advancement of Artificial Intelligence (AI) is revolutionizing Human Resource Management (HRM), offering organizations innovative tools to enhance recruitment, training, performance assessment, and employee engagement. AI-driven HR solutions improve efficiency, accuracy, and scalability, enabling HR professionals to focus on strategic decision-making. However, alongside these benefits, AI adoption raises critical ethical, legal, and social concerns, including algorithmic bias, data privacy issues, job security, and regulatory compliance.

This study, based on secondary data analysis, explores the dual impact of AI in HRM—its transformative capabilities and the associated challenges. The research evaluates key ethical and legal concerns, assesses AI's influence on workforce dynamics, and proposes best practices for responsible AI integration. By analysing real-world case studies, the study highlights strategies to mitigate AI-related risks, promote transparency, and ensure fairness in HR applications. The findings emphasize the importance of a balanced AI-HR approach that aligns technological advancements with ethical considerations, fostering a sustainable and equitable HRM framework. Organizations must adopt proactive governance strategies to build trust, uphold compliance, and harness AI's full potential while safeguarding employee rights and workplace integrity.

Keywords : *Artificial Intelligence (AI), Human Resource Management (HRM), Performance Management, Employee Engagement, Talent Acquisition, Ethical Concerns, Legal Compliance, Algorithmic Bias, Data Privacy, Automation, Predictive Analytics*

Introduction :

The rapid growth of Artificial Intelligence (AI) is transforming Human Resource Management (HRM), changing how organizations manage their workforce and make

decisions. Companies in various sectors are increasingly using AI-driven tools to improve essential HR functions like recruitment, training, performance assessment, and employee engagement. These technologies offer enhanced efficiency, accuracy, and scalability in HR operations, allowing organizations to refine their workforce management strategies. AI algorithms can sift through job applications, forecast employee performance, tailor learning programs, and even gauge workplace sentiment, enabling HR professionals to concentrate on more strategic, value-adding initiatives rather than just administrative tasks.

However, while AI brings many benefits, its incorporation into HRM comes with significant ethical, legal, and social challenges. The dependence on AI for crucial HR functions raises important issues related to algorithmic bias, data privacy, transparency, job security, and regulatory compliance. AI systems often learn from historical data, which, if biased or unrepresentative, can reinforce and even worsen existing inequalities. This may result in discriminatory hiring practices, unjust performance evaluations, and potential violations of equal employment opportunities. Additionally, the extensive gathering and analysis of employee data present serious risks concerning privacy, informed consent, and data security. Consequently, adhering to regulations like the General Data Protection Regulation (GDPR) and anti-discrimination laws has become more vital than ever.

Objectives of study :

1. Evaluate Ethical and Legal Challenges – Identify and discuss the ethical, legal, and social concerns associated with AI adoption in HR, including algorithmic bias, data privacy, and regulatory compliance.
2. Assess the Impact on Workforce Dynamics – Explore how AI-driven automation affects job security, employee autonomy, and decision-making in HR processes.
3. Recommend Best Practices for Responsible AI Integration – Highlight strategies for mitigating AI-related risks, ensuring transparency, and fostering fairness in HR applications.
4. Promote a Balanced AI-HR Approach – Advocate for policies that harmonize AI's efficiency with ethical considerations to create a responsible and sustainable HRM framework.

Scope of the study :

The growing automation of HR functions brings up worries about the future of work and the potential for job loss. While AI can enhance human decision-making, relying too heavily on it could reduce human oversight in hiring processes. Employees might find their autonomy

diminished, have fewer options to challenge automated decisions, and feel uncertain about how AI will affect their careers. These issues highlight the importance of a balanced strategy for integrating AI in HRM, one that takes advantage of the technology's benefits while also considering its ethical and legal consequences.

This paper examines the dual role of AI in human resource management, focusing on its transformative capabilities as well as the ethical and legal challenges it poses. Through the analysis of real-world case studies, we will showcase effective practices for managing AI-related risks while promoting responsible and equitable AI integration in HR. The discussion will also address the importance of transparent AI governance, strategies for reducing bias, and employee-focused AI policies to ensure a balance between technological progress and ethical standards. As AI continues to influence the HR field, organizations need to take a proactive stance that builds trust, fairness, and compliance while harnessing AI's full potential to enhance workforce management.

Literature Review :

Definitions -

- "Data privacy refers to the appropriate use of personal information, ensuring that it is handled in ways that are consistent with individuals' expectations and rights, and that it is protected from unauthorized access, misuse, or exploitation." (OECD, 2013)
- "Ethical concerns refer to the moral principles and values that guide an individual's or organization's behaviour, particularly in situations where there may be conflicting interests, values, or principles, and where decisions may have significant consequences for individuals, communities, or society as a whole." (Resnik, 2015)

1. Ethical and Legal Challenges of AI in Human Resource Management :

This article explores the integration of Artificial Intelligence (AI) into Human Resource Management (HRM) and its transformative impact on key HR functions such as recruitment, training, performance evaluation, and employee engagement. AI-powered tools, such as chatbots and predictive analytics, are enhancing efficiency and precision in these areas. For example, AI can automate resume screening and provide personalized training programs, significantly reducing the time and effort required for these tasks. However, the article also highlights several ethical and legal challenges associated with AI in HRM. One major concern is algorithmic bias, where AI systems trained on biased historical data can perpetuate or even amplify discrimination. A notable example is Amazon's AI recruiting tool, which was found to favor male candidates over female ones due to biased training data. To address

this, the article emphasizes the need for diverse datasets, regular audits, and human oversight to ensure fairness. Additionally, data privacy and security are critical issues, as AI systems often process vast amounts of personal employee data. Compliance with regulations such as the General Data Protection Regulation (GDPR) is essential to avoid legal repercussions. The article concludes by recommending ethical AI development, transparent governance, and employee support programs to mitigate risks and ensure responsible AI use in HRM.

2. The Role of Artificial Intelligence in Human Resource Management: Opportunities, Challenges, and Ethical Considerations :

This paper examines the opportunities AI brings to HRM, including streamlined recruitment, personalized training, and data-driven performance management. AI tools like chatbots and predictive analytics are improving efficiency and employee engagement by automating repetitive tasks and providing actionable insights. For instance, AI can analyse large volumes of job applications to identify top candidates and predict their future performance. However, the article also highlights significant challenges associated with AI adoption in HRM. One major issue is algorithmic bias, where AI systems may inherit biases from historical HR data, leading to discriminatory hiring practices and performance evaluations. Data privacy and security are also critical concerns, as AI systems often handle sensitive employee information. The lack of transparency in AI decision-making processes can further erode trust among employees, who may feel uneasy about decisions they do not understand.

Resistance to AI adoption is another challenge, as employees and HR professionals may fear job displacement or loss of human oversight. To address these issues, the article suggests implementing explainable AI models, conducting regular bias audits, and fostering employee AI literacy. It concludes that balancing AI's benefits with ethical practices is essential for successful HRM transformation, ensuring that AI complements human decision-making rather than replacing it.

3. AI and Employee Well-Being: Ethical Implications of AI-Driven HR Practices in Indian Universities :

This article focuses on the impact of AI-driven HR practices in Indian universities, particularly in areas such as talent acquisition, performance monitoring, and employee engagement. AI is being used to streamline recruitment processes, personalize learning paths, and analyze employee feedback to improve workplace satisfaction. For example, AI-powered chatbots can conduct initial interviews and provide instant responses to candidate queries,

enhancing the recruitment experience. However, the article also raises several ethical concerns related to AI in HRM. One major issue is algorithmic bias, where AI systems may favor certain groups over others due to biased training data, leading to unfair hiring and evaluation practices. Data privacy is another critical concern, as AI systems often collect and analyze large amounts of personal employee data, raising questions about surveillance and consent. Additionally, the automation of HR tasks through AI may threaten job security, creating anxiety among employees. To address these challenges, the article proposes an ethical framework that includes transparency, data protection, and fairness in AI decision-making. It also emphasizes the need for employee support programs, such as reskilling initiatives, to help workers adapt to AI-driven changes. The paper concludes that ethical AI adoption in universities requires balancing efficiency with human-centric values to ensure employee well-being and trust in AI-driven HR practices.

4. The Impact of Artificial Intelligence on Human Resource Management: Opportunities, Challenges, and Ethical Considerations :

This paper discusses how AI is transforming HRM by automating key functions such as recruitment, training, performance management, and employee engagement. AI tools like chatbots, predictive analytics, and sentiment analysis are enhancing efficiency and decision-making in these areas. For instance, AI can automate resume screening, provide personalized training programs, and analyse employee feedback to improve workplace morale. However, the article also highlights significant challenges associated with AI adoption in HRM. One major concern is algorithmic bias, where AI systems may reinforce existing biases if trained on skewed data, leading to unfair hiring and performance evaluation outcomes. Data privacy and security are also critical issues, as AI systems often process sensitive employee information, raising concerns about data breaches and misuse. Additionally, the lack of transparency in AI decision-making processes can erode trust among employees, who may feel uneasy about decisions they do not understand. Job displacement is another challenge, as the automation of HR tasks may reduce the need for certain roles, creating uncertainty for employees.

To address these issues, the article emphasizes the importance of using diverse datasets, ensuring data security, and maintaining transparency in AI-driven decisions. It also recommends ethical AI frameworks and human oversight to prevent over-reliance on automation. The paper concludes that responsible AI integration in HRM requires balancing

technological advancements with ethical and legal considerations, ensuring that AI complements human decision-making rather than replacing it.

5. Ethical Decision-Making in AI-Driven Human Resource Management :

This article explores the role of AI in HRM decision-making, particularly in areas such as recruitment, performance management, and employee engagement. AI is being used to automate candidate screening, track employee performance, and analyse workplace sentiment, improving efficiency and reducing human bias. However, the article also raises several ethical concerns related to AI-driven decision-making. One major issue is algorithmic bias, where AI systems may inherit biases from historical HR data, leading to unfair hiring or promotion practices. For example, if an AI system is trained on data that reflects past discriminatory practices, it may perpetuate those biases in its decisions. Transparency and explainability are also critical concerns, as employees may feel uneasy about AI-driven decisions if they do not understand how they are made. Data privacy is another significant issue, as AI systems often process vast amounts of personal employee data, raising concerns about security and misuse. To address these challenges, the article proposes an ethical framework that includes transparency, accountability, and bias mitigation strategies. It emphasizes the need for human oversight in AI-driven decisions to ensure fairness and employee trust. The paper concludes that ethical AI integration in HRM requires clear guidelines, regular audits, and a focus on human-centric values, ensuring that AI complements human decision-making rather than replacing it.

Reasearch Methodology :

- Creswell (2008): Research is a systematic investigation aimed at establishing facts. In the broadest sense, research involves gathering data, information, and facts to advance knowledge.
- Anita Letchimoney: Research is a systematic work to increase knowledge through creative efforts such as discoveries.

Process of Collecting Secondary Research :

Secondary research involves a systematic approach to gathering and analysing existing data. It begins with clearly defining the research objective and identifying key topics or questions. Relevant sources are then identified, spanning academic journals, government reports, industry analyses, online databases, and credible media. Data is gathered from these sources,

with a focus on credibility, relevance, and accuracy, often cross-referencing information to ensure validity. The collected data is organized and categorized by themes, using citation management tools to track sources and taking detailed notes on findings. Analysis involves identifying trends, patterns, and gaps, comparing viewpoints, and highlighting how the research supports or challenges the study. Finally, sources are cited and referenced properly, adhering to established citation guidelines.

This study has compiled secondary data from various research articles to establish a foundation for understanding the ethical and legal challenges of AI in Human Resource Management (HRM), and its role in enhancing employee engagement and satisfaction.

To further enrich our understanding, future research will focus on collecting primary data. This will involve – Surveys, Interviews, and Case Studies. The integration of primary data will provide a more comprehensive and nuanced perspective, allowing for a deeper exploration of the research questions and the development of actionable recommendations.

Findings and Discussions :

Findings :

1. **AI's Role in HRM :** AI enhances efficiency in recruitment, training, and workforce analytics, improving hiring accuracy and decision-making while reducing human bias.
2. **Bias and Discrimination** : AI systems can reinforce biases if trained on flawed data, highlighting the need for bias detection, diverse datasets, and regular audits.
3. **Privacy and Data Protection** : AI-driven HR tools raise concerns about data security and employee surveillance, necessitating compliance with laws like GDPR and transparent AI policies.
4. **Impact on Autonomy and Job Security** : Automation in HRM may reduce human oversight and employee autonomy, requiring a balance between AI efficiency and human control.
5. **Transparency Issues** : "Black box" AI models lead to distrust; explainable AI (XAI) frameworks can improve accountability and employee confidence.
6. **Legal and Compliance Risks :** AI-driven HR decisions must align with labor laws, requiring governance policies, legal audits, and adherence to evolving regulations.

Discussion :

- **Ethical Considerations :** AI in HRM must prioritize fairness, accountability, and privacy, with responsible AI principles guiding implementation.
- **Human-AI Collaboration :** AI should complement, not replace, human decision-making, fostering ethical and balanced HR practices.
- **Overcoming Resistance** : Organizations must address fears of AI through change management, AI literacy, and transparent policies.
- **Best Practices :** Bias mitigation, explainability, legal compliance, and employee-focused AI policies ensure responsible AI adoption.
- **Future Outlook** : Ethical AI adoption will focus on diversity, inclusion, employee well-being, and hybrid HR models integrating AI with human judgment.

Conclusion :

The use of AI in HR is changing how companies recruit, train, and manage employees. AI tools make tasks faster and more accurate, like sorting resumes or suggesting training programs. But there are challenges too. One big issue is bias—AI can sometimes make unfair decisions if it learns from biased data. To fix this, companies need to use diverse data and check AI systems regularly. Another concern is privacy, as AI handles a lot of personal information. Companies must follow laws like GDPR to protect employee data.

AI decisions can also be hard to understand, which makes employees uneasy. To build trust, companies should explain how AI works and let employees question its decisions. There's also worry about job loss due to automation. To help, companies should focus on retraining employees and using AI to support, not replace, human work.

In short, AI can make HR better, but companies must use it carefully. They should focus on fairness, transparency, and keeping employees involved. By balancing AI's benefits with ethical practices, companies can create a workplace that's efficient, fair, and future-ready.

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Risk Management in Oil and Gas Organizations: Prospects and Challenges

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Abstract: The oil and gas industry is characterized by complex operations, significant capital investment, and exposure to numerous risks, both internal and external. Effective risk management in this sector is critical to maintaining operational efficiency, ensuring safety, and safeguarding financial and environmental interests. This paper explores the prospects and challenges of risk management in oil and gas organizations, focusing on the evolving strategies to address financial volatility, safety hazards, environmental concerns, technological disruptions, and regulatory changes. With the advent of digital technologies, data analytics, and predictive modeling, organizations are increasingly able to forecast and mitigate risks more effectively. However, challenges such as geopolitical instability, fluctuating oil prices, and the transition to sustainable energy sources remain significant barriers. This study emphasizes the importance of adapting risk management frameworks to contemporary demands while highlighting the need for a proactive and holistic approach to ensure long-term sustainability and profitability in the sector.

Keywords: *Risk management, oil and gas industry, operational risks, financial volatility, environmental risks, sustainability, regulatory compliance etc.*

Introduction:

Risk Management in Oil and Gas Organizations :

Risk management in oil and gas organizations is an essential practice aimed at identifying, assessing, and mitigating risks to ensure the safe, efficient, and profitable operation of the industry. The oil and gas sector is inherently exposed to a wide range of risks due to its complexity, the high capital involved, and the unpredictable nature of global energy markets. These risks can arise from various sources, including financial fluctuations, operational hazards, environmental concerns, regulatory changes, geopolitical instability, and technological challenges.

The oil and gas industry operates in a high-risk environment, where even minor incidents can result in catastrophic consequences, ranging from financial losses to environmental damage.

As such, effective risk management is crucial for maintaining operational continuity, ensuring safety, and protecting the organization's reputation. Companies in the sector employ comprehensive risk management strategies to proactively address potential threats, minimize disruptions, and optimize decision-making.

In recent years, risk management in oil and gas has evolved to incorporate advanced methodologies, including the use of data analytics, predictive modeling, and more robust safety protocols. With the increasing global demand for energy and the rising pressures of sustainability and regulatory compliance, oil and gas companies must continuously refine their risk management frameworks to stay competitive and resilient in an ever-changing industry landscape.

Research Objectives:

1) To analyze the key risks faced by oil and gas organizations.
2) To evaluate the effectiveness of current risk management strategies in oil and gas organizations.
3) To explore the impact of technological advancements on risk management in the oil and gas sector.

Hypothesis:

1) H1: Effective risk management strategies positively influence the operational performance of oil and gas organizations.

H0: This hypothesis assumes that organizations with well-structured and proactive risk management practices experience fewer operational disruptions and enhanced safety performance.

2) H1: Technological advancements, such as data analytics and predictive modeling, significantly improve the risk management processes in oil and gas organizations.

H0: This hypothesis posits that the integration of advanced technologies can lead to more accurate risk assessments, better decision-making, and timely mitigation of risks in the oil and gas industry.

3) H1: Geopolitical instability and fluctuating oil prices are significant barriers to effective risk management in oil and gas organizations.

H0: This hypothesis assumes that external factors, like geopolitical tensions and volatile market conditions, present significant challenges to the successful implementation of risk management strategies.

Scope of Study:

The scope of this study encompasses an in-depth exploration of risk management in oil and gas organizations, focusing on both the prospects and challenges faced by companies in the sector. The study will utilize secondary data to investigate key risk factors, evaluate existing risk management frameworks, and identify emerging trends in the oil and gas industry.

- The study will cover global oil and gas operations, including both developed and emerging markets.
- The study will focus on the upstream, midstream, and downstream segments of the oil and gas industry, evaluating the unique risks faced by companies in exploration, production, transportation, refining, and distribution.
- The study will analyze the role of technological advancements, such as automation, data analytics, artificial intelligence, and predictive modeling, in shaping and enhancing risk management practices within the industry.
- The research will also examine the transition toward sustainable energy and the integration of renewable energy sources within the oil and gas sector, assessing how this shift influences risk management strategies and presents both opportunities and challenges.

Literature Review:

Risk Management Frameworks in Oil and Gas Sector:

Risk management in the Indian oil and gas sector follows globally recognized frameworks such as ISO 31000, COSO ERM, and API RP 580/581. These frameworks emphasize a structured approach to identifying, analyzing, and mitigating risks. Several Indian public-sector undertakings (PSUs) like ONGC, IOCL, and BPCL have adopted these frameworks to enhance safety and operational efficiency (Sharma, 2021).

In addition to global standards, the Directorate General of Hydrocarbons (DGH) and the Ministry of Petroleum and Natural Gas (MoPNG) regulate risk management practices through industry-specific policies. The Petroleum and Natural Gas Safety Organization (PESO) also plays a pivotal role in ensuring adherence to safety regulations (Kumar & Verma, 2020).

Stevens, P. (2008) explores the various geopolitical risks that impact the global oil industry in International Affairs. The article examines how political instability, conflicts, regulatory policies, and resource nationalism in oil-producing regions influence global oil supply, prices, and investments. Stevens discusses how energy security concerns drive the actions of both

producing and consuming nations, often leading to strategic alliances, interventions, and market fluctuations. The paper also addresses the role of multinational oil companies and their challenges in navigating these risks, emphasizing the need for risk mitigation strategies in an increasingly volatile global energy landscape.

Smith, E., et al. (2017) in Energy Policy analyze crisis management strategies within the petroleum industry, focusing on how companies and governments respond to disruptions such as oil spills, geopolitical conflicts, price shocks, and supply chain failures. The article discusses various risk assessment frameworks, contingency planning, and adaptive strategies that petroleum firms use to maintain stability during crises. It also highlights the role of regulatory policies, technological advancements, and corporate social responsibility in managing industry risks. The study emphasizes the importance of proactive measures, transparent communication, and collaboration between stakeholders to mitigate the impact of crises on both the industry and global energy markets.

Kumar, V., & Verma, R. (2020) in the Petroleum Journal of India examine the role of regulatory frameworks in managing risks within India's oil and gas sector. The article explores how government policies, safety regulations, and environmental guidelines shape industry operations, ensuring stability, sustainability, and risk mitigation. The authors discuss key challenges such as regulatory compliance, environmental concerns, and geopolitical influences, highlighting the effectiveness of existing frameworks in addressing these issues. The study also evaluates the impact of legal reforms and policy updates on investment, operational safety, and crisis management in the Indian oil and gas industry, emphasizing the need for continuous improvements to enhance sector resilience.

Mishra, S. (2018), in Journal of Environmental Studies, examines the environmental risks and safety concerns associated with offshore drilling in India. The study highlights the potential hazards, including oil spills, marine pollution, and ecosystem disruptions that arise from offshore exploration and production activities. It discusses the regulatory measures in place to mitigate these risks, analyzing their effectiveness and areas for improvement. The article also explores technological advancements and best practices in offshore drilling safety, emphasizing the need for stricter enforcement, industry accountability, and sustainable operational strategies to protect marine biodiversity and coastal communities.

Patil (2020) explores the adoption of Enterprise Risk Management (ERM) practices in Indian oil companies, analyzing how these firms integrate risk assessment, mitigation, and strategic decision-making to enhance operational resilience. The study highlights the challenges of ERM implementation, including regulatory compliance, financial volatility, and

environmental risks. It also examines the benefits of ERM, such as improved crisis response, better financial stability, and enhanced corporate governance, emphasizing the need for a structured risk management culture across the sector.

Rao and Mehta (2022) discuss various financial risks in the Indian oil and gas industry, including price volatility, currency fluctuations, and investment risks. The article evaluates different financial risk mitigation strategies such as hedging, diversification, and strategic financial planning. The authors highlight the role of government policies, global market trends, and corporate financial practices in managing risks effectively. The study underscores the importance of a dynamic risk management approach to ensure financial stability and long-term sustainability in the industry.

Sharma (2021) provides an in-depth analysis of different risk management frameworks used in the oil and gas industry. The study categorizes risks into operational, financial, environmental, and geopolitical domains and examines how companies implement structured frameworks such as ISO 31000 and COSO ERM to mitigate these risks. The paper also discusses case studies of successful risk management strategies, emphasizing the need for continuous assessment, regulatory compliance, and technological advancements to enhance risk resilience in the energy sector.

Sharma and Reddy (2021) explore how digitalization and predictive analytics are transforming risk management in the oil and gas industry. The study discusses the adoption of technologies such as artificial intelligence, big data, and IoT to predict and mitigate risks related to equipment failures, operational inefficiencies, and market fluctuations. The authors highlight case studies where predictive analytics has improved safety, reduced costs, and enhanced decision-making. The paper emphasizes the growing importance of digital transformation in ensuring proactive and data-driven risk management strategies for the sector.

Bedford and Cooke (2001) provide a comprehensive exploration of probabilistic risk analysis (PRA), outlining its theoretical foundations and practical applications. The book introduces key methods for quantifying uncertainty, including Bayesian networks, fault tree analysis, and Monte Carlo simulations. It emphasizes the role of probability in risk assessment, decision-making, and reliability engineering across various industries, including oil and gas. The authors present case studies and real-world applications, demonstrating how PRA can improve risk management and inform strategic decisions in high-stakes environments.

Elshazly et al. (2015) examine the environmental management practices adopted by the oil and gas industry to minimize ecological impacts. The article discusses the implementation of

sustainable policies, regulatory compliance, and corporate responsibility initiatives aimed at reducing pollution, waste, and carbon emissions. The study also highlights technological innovations, such as cleaner extraction methods and waste treatment solutions, to enhance environmental protection. The authors emphasize the importance of integrating environmental risk assessments and sustainability frameworks into industry operations to balance economic growth with ecological conservation.

Fraser and Simkins (2010) provide an extensive analysis of Enterprise Risk Management (ERM), offering insights into best practices and emerging trends for executives. The book explores the integration of ERM frameworks into corporate governance, financial decision-making, and strategic planning. It includes case studies from various industries, including oil and gas, highlighting how organizations can proactively manage risks related to finance, operations, and compliance. The authors stress the need for a risk-aware culture, effective leadership, and continuous improvement in ERM to enhance resilience and long-term success.

Hamilton (2013) investigates the relationship between oil prices and stock market volatility, analyzing how fluctuations in oil prices impact financial markets and economic stability. The study explores historical trends, identifying key factors such as geopolitical events, supply shocks, and macroeconomic policies that contribute to volatility. The author also discusses the role of investor sentiment, inflation, and exchange rate movements in shaping market responses to oil price changes. The paper underscores the interconnectedness of the energy sector and global financial markets, emphasizing the need for risk mitigation strategies in investment and policy-making.

Hopkins (2012) analyzes the Deepwater Horizon disaster, focusing on the human and organizational failures that led to the catastrophic oil spill in the Gulf of Mexico. The book highlights systemic issues such as poor safety culture, inadequate risk assessment, and decision-making failures within BP and its partners. It discusses the role of leadership, regulatory oversight, and communication breakdowns in escalating the crisis. Hopkins emphasizes the need for organizations to prioritize safety, learn from past incidents, and implement structural reforms to prevent similar disasters in high-risk industries.

Kletz (2009) provides a detailed guide to Hazard and Operability Studies (HAZOP) and Hazard Analysis (HAZAN), two widely used methodologies for identifying and assessing risks in process industries like oil and gas. The book explains how systematic risk assessments can help prevent accidents, improve process safety, and ensure regulatory compliance. It includes case studies, practical applications, and best practices for conducting

effective risk evaluations. Kletz advocates for a proactive safety culture where potential hazards are identified and mitigated before they lead to serious incidents.

Kumar et al. (2019) explore the role of human factors in risk management within the oil and gas sector. The article examines how human errors, decision-making biases, training deficiencies, and workplace culture contribute to accidents and operational failures. The authors discuss strategies for improving safety performance, such as enhanced training programs, ergonomic design, and human-machine interaction improvements. The study emphasizes the need for a holistic approach to risk management that considers both technical and behavioral factors to reduce incidents and improve overall industry safety.

Mitchell et al. (1997) propose a theoretical framework for identifying and prioritizing stakeholders in corporate decision-making. The study introduces the concept of stakeholder salience, which is determined by three key attributes: power, legitimacy, and urgency. The article is widely used in risk management and corporate governance discussions, including the oil and gas industry, where balancing the interests of regulators, investors, employees, and communities is crucial. The authors argue that firms should strategically engage with stakeholders based on their influence and the immediacy of their concerns.

Perera et al. (2020) explore how the Internet of Things (IoT) is revolutionizing risk management in the oil and gas industry. The article discusses the implementation of IoT technologies, such as real-time monitoring, predictive maintenance, and automated safety systems, to enhance operational efficiency and reduce risks. The study highlights case studies where IoT applications have improved asset management, reduced downtime, and minimized environmental hazards. The authors emphasize the growing importance of digital transformation in making the industry safer and more sustainable.

Key Risks in Indian Oil and Gas Organizations:

1. Operational Risks: Operational risks include equipment failures, process inefficiencies, and human errors. Studies highlight that pipeline leaks and refinery accidents are among the primary concerns (Gupta et al., 2019). The use of predictive maintenance, digital twin technology, and real-time monitoring has been suggested to reduce such risks.

- **Equipment Failures:** Equipment failures in oil and gas operations can have catastrophic consequences, leading to unplanned downtime, production losses, and safety hazards. Aging infrastructure, inadequate maintenance, and manufacturing defects are common causes of equipment failure (Hopkins, 2012). Preventive maintenance programs and real-time monitoring systems can help mitigate these risks.

- **Accidents:** The oil and gas industry is prone to accidents, including explosions, fires, and leaks, which can cause fatalities, environmental damage, and financial losses. Poor safety practices, lack of proper training, and non-compliance with safety regulations contribute to such incidents. Effective risk assessment methodologies, stringent safety protocols, and emergency response strategies are critical in minimizing accident risks (Hopkins, 2012).
- **Human Errors:** Human errors, such as miscalculations, incorrect operational procedures, and fatigue-related mistakes, can significantly impact oil and gas operations. The complex and high-pressure work environment increases the likelihood of human errors. Implementing rigorous training programs, enhancing safety culture, and utilizing automation to reduce manual interventions can help in mitigating these risks (Hopkins, 2012).

2. Environmental and Safety Risks: Environmental degradation and safety hazards are critical concerns in oil and gas operations. Accidents such as oil spills and gas leaks have led to significant environmental damage and loss of human life (Mishra, 2018). Indian firms have increasingly adopted safety management systems and environmental risk assessment techniques, including HAZOP (Hazard and Operability Study) and QRA (Quantitative Risk Assessment).

3. Financial and Market Risks: Volatility in global crude oil prices directly impacts Indian oil and gas companies. Price fluctuations, currency exchange risks, and supply chain disruptions pose significant financial challenges (Rao & Mehta, 2022). Hedging strategies and financial risk modeling have been widely used to mitigate such risks.

4. Regulatory and Geopolitical Risks: The oil and gas industry in India is highly regulated. Compliance with environmental norms, taxation policies, and international trade restrictions adds to the complexity (Bansal & Singh, 2021). Additionally, geopolitical tensions with oil-exporting countries can disrupt supply chains, necessitating strategic reserves and diversification of import sources.

Best Practices in Risk Management

1) Indian oil and gas companies have adopted several best practices to manage risks effectively.
2) Integration of Digital Technologies: The use of Artificial Intelligence (AI), IoT, and big data analytics has enhanced predictive risk management (Sharma & Reddy, 2021).

3) Enterprise Risk Management (ERM) Implementation: Companies like ONGC and GAIL have implemented ERM frameworks to systematically address risks (Patil, 2020).
4) Public-Private Partnerships (PPP): Collaborative efforts between government agencies and private players have improved risk mitigation strategies.
5) Sustainability Initiatives: Investment in renewable energy and emission reduction programs help in managing long-term environmental risks.

Research Gaps in Existing Literature on Risk Management in the Oil and Gas Industry

Below are the key research gaps identified based on the reviewed sources:

1. **Integration of Human and Technological Factors in Risk Management:** While studies such as Hopkins (2012) and Kumar et al. (2019) emphasize the role of human factors in risk management, and Perera et al. (2020) discusses IoT applications, there is a lack of research on how human decision-making and technological advancements (such as AI and predictive analytics) can be integrated for comprehensive risk mitigation.
2. **Evolving Regulatory and Policy Frameworks for Modern Risk Management**: Kumar & Verma (2020) explore regulatory frameworks in India, and Elshazly et al. (2015) examine environmental regulations globally. However, there is limited research on how regulatory frameworks need to evolve with emerging challenges such as climate change, cyber threats, and geopolitical shifts.
3. **Effectiveness of Enterprise Risk Management (ERM) in Oil and Gas Firms:** Fraser & Simkins (2010) and Patil (2020) discuss ERM adoption, but there is limited empirical evidence on how ERM frameworks impact financial resilience and operational efficiency in the oil and gas industry.
4. **Impact of Oil Price Volatility on Global Energy Markets and Financial Systems**: While Hamilton (2013) explores the relationship between oil prices and stock market volatility, further research is needed to understand how recent market disruptions (e.g., COVID-19, geopolitical conflicts, and renewable energy adoption) affect global financial systems and economic stability.
5. **Lessons from Major Industrial Disasters and Their Application to Future Risk Prevention:** Paté-Cornell (1993) and Hopkins (2012) provide retrospective analyses of the Piper Alpha and Deepwater Horizon disasters, but there is limited research on how these lessons have been practically implemented across the industry.

Research Methodology:

Research Design: This study employs a descriptive and analytical research design, focusing on a systematic review of secondary data from published academic literature, industry reports, and regulatory guidelines. The study aims to:

- Identify key risk management challenges in the oil and gas sector.
- Examine regulatory frameworks, financial risks, environmental concerns, and digital transformation in risk management.
- Highlight research gaps and future directions in oil and gas risk mitigation strategies.

Data Collection Method :

Secondary Data Collection

The study relies on secondary data sources, which include:

- Academic Journals and Books: Peer-reviewed publications from sources such as Safety Science, Energy Policy, Global Finance Journal, Risk Analysis, Journal of Environmental Studies, and other relevant journals.
- Industry Reports: Reports published by organizations such as the International Energy Agency (IEA), Oil & Gas UK, the World Economic Forum, and the Organization of the Petroleum Exporting Countries (OPEC).
- Government and Regulatory Documents: Policies and frameworks from organizations like the Environmental Protection Agency (EPA), the Occupational Safety and Health Administration (OSHA), and industry-specific regulatory bodies.

Comparative Analysis : A comparative analysis was conducted between different risk management frameworks and their implementation in various regions. This involved evaluating the effectiveness of risk mitigation strategies used in developed economies versus developing economies in the oil and gas industry.

Limitations of the Study

- Dependence on Secondary Data: The study relies on previously published research and reports, which may not capture real-time industry changes.
- Regional Focus Limitations: While global data is considered, some findings may be more relevant to specific regions (e.g., India, the U.S., Europe).
- Lack of Primary Data: Interviews or surveys from industry professionals could provide deeper insights but were not included in this study.

Findings of Secondary Research on Risk Management in the Oil and Gas Industry

1. Human and Organizational Factors in Risk Management

- Studies such as Hopkins (2012) and Kumar et al. (2019) highlight that human errors, decision-making biases, and organizational failures are major contributors to industrial disasters, such as the Deepwater Horizon spill.
- A strong safety culture, proper training, and effective leadership are crucial in preventing accidents. However, many organizations still struggle with implementing consistent safety policies.
- Despite advancements in technology, human oversight remains critical in risk management, as automation alone cannot prevent operational failures.

2. Role of Regulatory Frameworks and Compliance

- Kumar & Verma (2020) and Elshazly et al. (2015) emphasize that regulatory frameworks play a crucial role in mitigating risks in the oil and gas industry. However, enforcement and compliance remain challenges, especially in developing countries.
- Regulatory gaps exist in areas such as environmental protection, occupational safety, and cybersecurity, which require continuous policy revisions.
- Companies that proactively comply with international safety and environmental standards, such as ISO 14001 and API RP 75, tend to have better risk management outcomes.

3. Financial and Market Risks in the Oil and Gas Sector

- Hamilton (2013) finds that oil price fluctuations significantly impact global financial markets, causing volatility in stock prices and economic uncertainty.
- Rao & Mehta (2022) discuss that oil companies use hedging, diversification, and financial planning to mitigate market risks, but external factors like geopolitical tensions and global energy transitions still pose challenges.
- Long-term financial stability in the industry requires robust investment strategies, flexible pricing models, and government interventions during economic downturns.

4. Environmental and Safety Risks in Offshore Drilling

- Mishra (2018) and Paté-Cornell (1993) reveal that offshore drilling operations are highly vulnerable to environmental disasters due to oil spills, equipment failures, and extreme weather conditions.
- Elshazly et al. (2015) highlight that while environmental management practices are improving, many oil companies still struggle with balancing profitability and sustainability.
- The adoption of new technologies such as remote monitoring, real-time leak detection, and bioremediation techniques has helped reduce environmental risks but is not yet widespread across all regions.

5. Adoption of Enterprise Risk Management (ERM) Practices

- Fraser & Simkins (2010) and Patil (2020) discuss how ERM frameworks are increasingly being adopted by oil and gas firms to manage operational, financial, and regulatory risks.
- Companies with well-structured ERM frameworks tend to perform better during crises and economic downturns, as they are better prepared for uncertainties.
- However, the effectiveness of ERM depends on corporate governance, risk culture, and continuous monitoring, which many firms still need to improve.

6. Digitalization, IoT, and Predictive Analytics in Risk Management

- Sharma & Reddy (2021) and Perera et al. (2020) find that digital technologies, such as IoT, big data, and predictive analytics, are transforming risk management by enabling real-time monitoring and proactive decision-making.
- AI-driven predictive models help detect early signs of equipment failure, reducing downtime and operational risks.
- However, Sharma & Reddy (2021) caution that increased reliance on digitalization also introduces cybersecurity risks, which need to be addressed through advanced cybersecurity protocols.

7. Stakeholder Engagement and Corporate Social Responsibility (CSR)

- Mitchell et al. (1997) suggest that effective stakeholder engagement is key to risk management, particularly in high-risk sectors like oil and gas.

- Companies that actively involve local communities, environmental organizations, and regulatory bodies in decision-making tend to have fewer legal disputes and reputational risks.
- CSR initiatives, such as investments in renewable energy and community development projects, can help oil companies mitigate risks associated with public opposition and environmental concerns.

8. Lessons from Past Industrial Disasters

- Hopkins (2012) and Paté-Cornell (1993) emphasize that many industrial disasters, such as Piper Alpha and Deepwater Horizon, occurred due to failures in risk assessment, regulatory oversight, and emergency preparedness.
- Key lessons include the need for stronger safety regulations, real-time risk assessment tools, and more transparent corporate governance.
- Despite learning from past incidents, many companies still exhibit a reactive rather than proactive approach to risk management, indicating a need for continuous improvement.

Conclusion:

The oil and gas industry faces a wide range of risks, including human and organizational failures, regulatory challenges, financial volatility, environmental hazards, and technological vulnerabilities. This research, based on an extensive review of secondary literature, highlights key insights into existing risk management practices and identifies critical research gaps that require further exploration.

One of the most significant findings is that human and organizational factors remain major contributors to industrial disasters, despite advancements in technology and automation (Hopkins, 2012; Kumar et al., 2019). Regulatory frameworks play a crucial role in mitigating risks, but inconsistent enforcement and evolving global challenges, such as climate change and cyber threats, require continuous policy updates.

Enterprise Risk Management (ERM) has emerged as a critical approach for oil and gas firms to enhance resilience, yet there is a lack of empirical evidence on its long-term effectiveness (Fraser & Simkins, 2010; Patil, 2020). The growing adoption of digital technologies, such as IoT, AI, and predictive analytics, has improved real-time risk assessment but has also introduced cybersecurity vulnerabilities that require further attention (Sharma & Reddy, 2021; Perera et al. 2020).

Risk management in Indian oil and gas organizations is evolving with advancements in technology and regulatory reforms. While challenges remain, proactive strategies such as digital transformation, ERM frameworks, and sustainable practices are enhancing resilience in the sector.

Implications and Future Research Directions :

This study highlights several critical research gaps that should be explored further:

- Integration of Human and Technological Factors: How AI, automation, and human decision-making can work together for better risk mitigation.
- Regulatory Adaptation to Emerging Risks: How governments and industry regulators can update policies to address digital threats, climate change, and energy transitions.
- Financial Risk Management Innovations: How firms can develop new financial models to navigate oil price fluctuations and economic instability.
- Cyber security in Digital Oilfields: How companies can balance digital transformation with robust cyber security protections.

The Future Research Direction of study:

- Further studies should focus on how artificial intelligence (AI), automation, and machine learning can complement human expertise in minimizing operational risks and decision-making biases in oil and gas operations.
- Comparative analyses of regulatory responses in different countries, especially concerning new environmental policies, digital threats, and renewable energy transitions, are required to provide updated recommendations for policymakers.
- More case studies and longitudinal studies are needed to assess the long-term benefits of ERM adoption, especially in mitigating financial risks and improving sustainability practices.
- Studies should focus on predictive models that integrate macroeconomic factors, technological disruptions, and geopolitical risks in forecasting oil price fluctuations and their impact on financial markets.
- More empirical studies are needed to evaluate how companies have adapted risk management strategies post-disaster and whether these changes have effectively prevented similar incidents.

- Studies should focus on how stakeholder engagement, corporate social responsibility (CSR), and community participation influence risk management decisions, particularly in regions with high environmental and social concerns.
- More research is needed on how carbon capture, bio-remediation techniques, and alternative drilling technologies can reduce the ecological impact of offshore oil exploration.
- Future studies should investigate the vulnerabilities of digital oilfield technologies, cyber security threats, and best practices for protecting critical energy infrastructure from cyber-attacks.

By addressing these research gaps, future studies can contribute to developing more effective, resilient, and sustainable risk management frameworks for the global oil and gas industry. Ultimately, a proactive, technology-driven, and stakeholder-inclusive approach to risk management is essential to ensuring long-term industry stability, environmental sustainability, and financial resilience.

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Shrinkflation Strategies, Ethics and Consumer Reactions

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Abstract: Shrinkflation, the practice of reducing product size while maintaining the same price, is a growing concern among consumers. This paper explores how marketing strategies shape consumer perception of shrinkflation, the ethical considerations involved, and how consumers react to such practices. By examining case studies, consumer behavior theories, and ethical frameworks, we provide insights into how brands manage shrinkflation through communication strategies and branding efforts.

Keywords: *Shrinkflation, Consumer Behavior, Marketing Strategies, Ethics, Brand Loyalty*

Introduction:

Shrinkflation is a common tactic used by manufacturers to offset rising production costs without raising product prices. While it helps businesses maintain profit margins, consumers often perceive it as deceptive. Marketing plays a crucial role in shaping consumer perception by either downplaying shrinkflation, emphasizing brand loyalty, or justifying the changes through quality improvements. This paper investigates how marketing influences consumer awareness and acceptance of shrinkflation and evaluates the ethical considerations associated with this practice.

Marketing Strategies for Shrinkflation:

Shrinkflation is not a new phenomenon but has gained increased attention due to economic inflation and supply chain disruptions. Prior research highlights its impact on consumer trust

and purchasing behavior. Marketing techniques such as package redesign, subtle messaging, and product bundling can influence consumer perception of shrinkflation. Companies often use value-based marketing to justify downsizing by promoting other product benefits.

Here are some effective marketing strategies:

A. Transparent Communication

i. Honesty Builds Trust: Acknowledge the change and explain why it's happening (e.g., rising costs of ingredients, supply chain issues).
ii. Positive Framing: Highlight that you're maintaining quality rather than raising prices.
iii. Brand Storytelling: Use messaging like "We're committed to keeping the same great taste while adapting to market conditions."

B. Value-Added Positioning

i. Highlight Quality Over Quantity: Emphasize premium ingredients, sustainable sourcing, or improved packaging.
ii. Reinforce Brand Loyalty: Offer loyalty rewards, discounts, or bonuses for long-time customers.

C. Packaging & Design Tweaks

i. Avoid Direct Comparisons: Make subtle packaging changes to avoid immediate negative perceptions.
ii. New Formats: Rebrand the product as a "convenient size" or "on-the-go" version.
iii. Eco-Friendly Messaging: Position the change as a step toward sustainability (e.g., "Less waste, same great product").

D. Promotional Offers & Bundling

i. Combo Deals: Bundle products together to give the impression of more value.
ii. Limited-Time Offers: Introduce temporary promotions to shift focus from size reduction.
iii. Cross-Promotions: Partner with complementary brands to enhance perceived value.

E. Influencer & Social Media Engagement

i. Proactive PR: Have influencers or brand advocates communicate the change positively.
ii. Interactive Campaigns: Use social media to engage customers in discussions and polls about preferences.
iii. User-Generated Content: Encourage reviews and testimonials that focus on taste and quality rather than size.

F. Competitive Benchmarking

i. Price Comparison Strategy: Show that competitors are also adjusting their product sizes or pricing.

ii. Market Positioning: Differentiate by emphasizing what makes your product the best choice.

G. Product Innovation

i. Introduce New Variants: Launch new flavors, limited editions, or enhanced versions to shift attention.

ii. Upgrade Packaging Experience: Make the product feel premium through resealable bags, new textures, or convenience features.

Ethical Considerations:

Ethical concerns arise when companies do not transparently disclose shrinkflation. Theories of business ethics, including deontology and consequentialism, help analyze the moral implications of these marketing tactics.

A. Consumer Deception : Shrinkflation can be perceived as misleading if companies reduce product size without transparently informing consumers. Ethical marketing should prioritize honesty and clarity rather than subtly shrinking products in a way that takes advantage of consumer trust.

B. Transparency & Disclosure : Companies have an ethical responsibility to communicate changes in product size or quality openly. Failing to disclose such changes can lead to consumer distrust and damage brand reputation. Ethical brands should consider clear labeling or messaging that informs customers of any modifications.

C. Fair Value Exchange : Consumers expect to receive fair value for their money. Shrinkflation undermines this expectation by delivering less product for the same or a higher price. Ethical companies should focus on maintaining product integrity or justifying changes through value-driven alternatives (e.g., improved formulation or sustainability initiatives).

D. Impact on Vulnerable Consumers : Shrinkflation disproportionately affects low-income consumers who are more sensitive to price changes. Since they often buy staple goods in specific quantities, a reduction in size may force them to buy more frequently, increasing their overall expenditure.

E. Brand Reputation & Long-Term Trust : While shrinkflation may offer short-term

financial benefits, it can harm long-term consumer trust. Ethical marketing practices prioritize building loyal relationships rather than exploiting short-term gains through tactics that consumers may perceive as manipulative.

F. **Alternative Ethical Approaches :** Instead of relying on shrinkflation, companies can explore other ethical ways to manage rising costs, such as:

i. Providing transparent explanations for price increases.
ii. Offering economy-sized options for cost-conscious consumers.
iii. Enhancing product value through quality improvements or sustainability.

Consumer Reactions: Consumer responses to shrinkflation range from indifference to outrage. Behavioral economics and psychology provide insights into how consumers detect and react to changes in product size.

A. Negative Reactions & Consumer Backlash

i. Feelings of Betrayal: Many consumers see shrinkflation as deceptive, especially when brands don't openly disclose the changes.
ii. Social Media Outrage: Consumers frequently call out brands on platforms like Twitter, Reddit, and TikTok, posting comparison images of old vs. new packaging.
iii. Brand Loyalty Erosion: Customers may switch to competitors or generic brands once they notice the downsizing.
iv. Legal & Regulatory Scrutiny: Some governments and consumer advocacy groups call for clearer labeling to prevent misleading marketing.

B. Adaptation & Consumer Workarounds

i. Switching to Bulk Purchases: Consumers may opt for larger, cost-effective alternatives.
ii. DIY Solutions: Some prefer homemade versions of products they feel have been diminished in quality or quantity.
iii. Boycotting Brands: Some consumers actively avoid brands known for aggressive shrinkflation tactics.

C. Occasional Acceptance or Justification

i. Inflation Awareness: Some consumers acknowledge that rising production costs and inflation force companies to make tough decisions.
ii. Loyalty to Trusted Brands: Some are willing to accept minor reductions if they still prefer the brand’s quality over competitors.

Conclusion:

The role of marketing in shrinkflation is multifaceted, involving strategic communication, ethical considerations, and consumer psychology. Brands must balance profitability with transparency to maintain long-term consumer trust. Further research is needed to explore regulatory interventions and evolving consumer expectations. From an ethical standpoint, shrinkflation marketing should prioritize transparency, consumer trust, and fairness. While it may be a necessary business strategy at times, companies that openly communicate changes and maintain value for consumers will be more likely to retain customer loyalty and uphold ethical business practices.

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