3.3.2 Number of Research Papers per Teacher in Journals Notified on UGC Website during the Year 2023-24

SI No	Title of the paper	Name of the author/s	Department of the teacher	Name of the Journal	Year of Publication	ISSN Number	Link to the recognition in the UGC Enlistment of the journal
1	Impact of Systematic Investment Plans (SIP) Awareness on the Investment Decision of Information Technology (IT) Employees in Bengaluru City	Ms. Arshiya Khanum	Department of Commerce	International Journal for Multidisciplinary Research	2024	E ISSN:2582-2160	https://www.ijfmr.com/research-paper.php?id=24795.
2	Determinants of Digital Payment: An Empirical Study with reference to Bangalore City	Ms. Maneesha & Dr. M Jubi	Department of Management Centre for PG Studies	African Journal of Biological Science	2024	ISSN:2663-2187	https://www.afjbs.com/issue-content/determinants-of-digital-payments-an-empirical-study-with-reference-to-bangalore-city-2375
3	Artificial Intelligence in Industry 4.0	Dr. Asha N	Principal	African Journal of Biological Sciences	2024	ISSN: 2663-2187	https://www.afjbs.com/issue-content/artificial-intelligence-in-industry-4-0-2187.
4	Capital Structure Determinants: A Case Study of Pharmaceutical	Dr. M Jubi, Mr. Vaidyesh M A	Centre for PG Studies Department	Educational Administration: Theory and	2024 (May)	ISSN:1300-4832 E-ISSN:2148-2403	https://kuey.net/index.php/kuey/article/view/4742

		Industry	Ms. Reethu Rachel Raj	of Management	Practice			
5	Big Data Analytics in Support of the Decision-Making Process in IT Sector	Dr. Sri Hari V	Department of Commerce	Journal of Informatics Education and Research	2024	ISSN: 1526-4726	https://jier.org/index.php/journal/article/view/965/
6	A Study on Financial Analysis of Selected Public Sector Banks Using Camel Ratios	Dr. Sri Hari & Dr Rajdeep K Manwani Dr. Rahul K. Kavishwar and	Department of Commerce, Centre for PG Studies and Research Department	International Neurourology Journal	2024	ISSN:2093-4777 | E-ISSN:2093-6931 Vol. 28 Iss. 1 (2024)	https://einj.net/index.php/INJ/article/view/424
7	A Study on Consumer Purchase Intention Towards Functional Dairy Products in Bengaluru North	Ms. Sashikala	Department of Management	Migration Letters	2024	ISSN:1741-8992 (online) ISSN:1741-8984(Print)	https://migrationletters.com/index.php/ml/article/view/7733
8	"Awareness and Challenges of Digital Inclusion for Micro and Small Entrepreneurs in Rural Bangalore"	Dr. K Uma Maheswari	Centre for PG Studies	Indian Journal of Natural Science (IJONS)	2024	ISSN:0976-0997	https://tnsroindia.org.in/JOURNAL/issue82/IJONS%20-%20ISSUE%2082%20-%20%20FEB%202024%20-%20FULL%20TEXT%20PART%20%20-%2001.pdf.
9	The Effect of Supportive Leadership on Employee Endurance and Organisational Absurdity in the Workplace	Dr.K Uma Maheshwari	Centre for PG Studies	European Economic Letters	2023	ISSN:2323-5233	https://www.eelet.org.uk/index.php/journal/article/view/834
10	A study on Assessing	Dr. Sri Hari V,	Department	Journal of Tianjin	2023	ISSN: 0493-2137	https://tianjindaxuexuebao

	Determinants of Deposit Volume by adopting the Camels rating of selected private Indian Banks	Ms. Jayashree Tambad & Mr. Shivakumar R	of Commerce	University Science and Technology			.com/details.php?id=DOI: 10.5281/zenodo.10099591
11	Design Thinking and Problem-Solving Skills Among Students Using The Mind Mapping Technique- A Case Study	Dr. Rajdeep K.Manwani Ms. Asha N Dr Padmavathy.K	Department of Commerce & English Department	Seyboldreport	2023	ISSN:1533-9211	**https://www.seyboldreport.net/abstract-2023/11-01.html**
12	Review Article on IoT & Sensor Technology Across Different Sectors	Ms. Hemalatha R	Department of Computer Science	Journal of Engineering, Computing and Architecture	2023	ISSN: 1934-7197	https://journaleca.com/volume-13-issue-11-2023/
13	Detecting Financial Fraud in the Digital Age: The AI and ML Revolution	Dr. Sowmya G S	Centre for PG Studies	International Journal for Multidisciplinary Research (IJFMR)	2023	ISSN 2582-2160	https://www.ijfmr.com/research-paper.php?id=6139/
14	An Empirical study on the Future Plans and Micro and Macro Factors Affecting Undergraduate Student's Life Ambitions and career choices	Dr. Rajdeep K. Manwani	Department of Commerce	International Journal of Early Childhood Special Education.	2023	ISSN: 1308-5581	https://www.int-jecse.net/article/An+Empirical+study+on+the+future+plans+and+micro+and+macro+factors+affecting+undergraduate+students%2527+life+ambitions+and+career+choices._4834/
15	Lessons from the Past for Creating A Strong Future	Dr. Sowmya G S	Centre for PG Studies	International Journal of Creative Research Thoughts	2023	ISSN: 2320-2882	https://ijcrt.org/papers/IJCRT2301115.pdf
16	A study on quality services at private hospitals in Bangalore	Ms. Jayashree Tambad, Ms. Savitha N L,	Department of Commerce	History Research Journal	2024	ISSN 0976-5424(P)	Printed

		Ms. Pooja D					
17	A Study on rating of PSB's (VS) PVB's using Camel Rating Model Ratios	Ms. Jayashree Tambad, Dr. Sri Hari V	Department of Commerce	Shodha Prabha	2023	ISSN:0974-8946	Printed

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Impact of Systematic Investment Plans (SIP) awareness on the investment decision of Information Technology (IT) Employees in Bengaluru City

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Abstract:

The mutual fund industry in India is experiencing rapid expansion and is considered to be one of the most rapidly growing sectors within the nation's economy. Furthermore, it possesses significant prospects for sustained and substantial development in the long run. Mutual funds, along with their diverse range of instruments including systematic investment plans (SIPs), equity funds, debt funds, and hybrid fund instruments, have made a substantial contribution to economic growth in both the corporate sector and among individuals over the past decade. The current study focuses on the Systematic Investment Plan (SIP), which has emerged as a feasible alternative investment strategy for numerous investors aiming to achieve substantial returns while mitigating risk through incremental investments. The utilization of these funds facilitates the ease, availability, and affordability of saving and investing. The systematic investment plan (SIP) offers several advantages, such as professional management, diversification, diversity, liquidity, affordability, comfort, and ease of record keeping. Additionally, SIP is subject to stringent government regulation and ensures complete transparency. The current study has examined various variables related to investment and the factors that investors consider when selecting a Systematic Investment Plan. The objective of this study is to examine the level of awareness of systematic investment plans (SIP) among information technology (IT) employees and investigate the influence of demographic variables on their engagement in such investment plans. The primary objective of this study is to examine the influence of systematic investment plan (SIP) awareness on individuals' investment choices. The primary objective of this study is to examine the viability of Systematic Investment Plans (SIPs) in the Indian context, while considering the various issues, intricacies, and factors involved. Additionally, the study aims to propose strategies and approaches to effectively address the challenges associated with developing mutual funds in alignment with the economic growth potential of the country. The present study utilizes primary data obtained from a sample of 112 information technology employees located in Bangalore. The data was analyzed using SPSS version 25. The findings of the study indicate that IT employees possess awareness regarding SIP funds, albeit with a restricted comprehension of the structural and operational aspects of SIP investments. The choice to allocate funds towards Systematic Investment Plan (SIP) investments is notably impacted by variables such as age,

income level, and educational attainment. The level of awareness regarding SIP (Systematic Investment Plan) has a significant impact on investment decision-making, as evidenced by a substantially high proportion. There exists a necessity to enhance awareness and facilitate the dissemination of information regarding SIP (Systematic Investment Plan) and its potential advantages.

Keywords: Awareness, Systematic Investment Plans (SIP) ,Information Technology (IT) Employees, Investment decision

INTRODUCTION

Individuals are consistently seeking methods to allocate funds for future financial security. Individuals accomplish this by allocating their earned income towards diverse investment strategies. Occasionally, individuals experience a satisfactory yield on their investment, whereas in other instances, they perceive their investment as an unproductive allocation of time and financial resourcesSachan, A., &Chugan, P. K. (2020). Nevertheless, the contemporary market offers a variety of both traditional and contemporary investment programs that offer advantageous returns and secure long-term prospects. In contemporary times, individuals have access to a diverse range of methods for saving and investing their funds. These include options such as fixed deposits, gold investments, insurance schemes, real estate, Public Provident Fund (PPF), recurring deposits, mutual funds, systematic investment plans, Reserve Bank of India (RBI) bonds, and National Pension Schemes, among other possibilities. Mutual funds and structured investment plans (SIPs) are considered to be highly sophisticated investment strategies with a strong potential for generating favorable returns on investment. The current context is serving as a demonstration of its utilitySendilvelu, K., & Shah, M. D. (2021).

In contemporary times, there is a growing discourse surrounding the utilization of mutual funds as a viable investment strategy within the prevailing market landscape. Mutual funds are structured as trusts, wherein various entities such as sponsors, trustees, asset management firms (AMCs), and custodians collaborate to oversee the management of assets. All Mutual Funds are obligated to undergo registration with the Securities and Exchange Board of India (SEBI), an entity that operates under the SEBI (MF) Regulation, 1996, and exercises authority over the SEBI (MF) Regulation, 1996. Individuals have the ability to easily allocate their funds by utilizing these financial instruments. A prevalent objective among investors is to strategically allocate investments in order to maximize returns within a short timeframe, while simultaneously mitigating the risk of capital lossBhatia, A., Chandani, A., &Chhateja, J. (2020). Therefore, it is imperative for the investor to carefully assess their risk profile in relation to the inherent risks associated with the investment vehicle prior to making an informed decision to allocate their funds. Certain investment options exhibit a heightened degree of risk, yet possess the capacity to yield higher returns adjusted for inflation compared to alternative asset classes over an extended time horizon. Conversely, other investments entail a lower level of risk but generate comparatively lower returns over the long term. Systematic Investment Plans (SIPs) through mutual funds are crucial for comparative analysis with other forms of investment. Their ability to generate higher returns, coupled with effective security measures and risk management strategies, represents a significant factor. Over the past two decades, there has been a widespread desire for a more promising future, and SIP has undeniably played a significant role in advancing this objective through its noteworthy contributionsDumitriu, R., &Stefanescu, R. (2020). India is a nation wherein a significant proportion, approximately half, of its populace falls within the middle- or upper-middle-income stratum. The traditional culture and prevailing

attitudes in India foster a propensity for saving among individuals, enabling them to fulfill their various life obligationsKartini, K., &Nahda, K. (2021). Systematic Investment Plans (SIPs) can prove advantageous for individuals with modest to moderate incomes, as they serve as suitable investment instruments for this demographic. Investing in Systematic Investment Plans (SIPs) offers the opportunity to generate modest returns and accumulate wealth, alleviating concerns regarding the fulfillment of additional financial responsibilities. However, these methods are not commonly employed or implemented by the general populace. The present study focuses on individuals with the highest income in Bengaluru City, specifically IT employees.

With this background ,The primary aim of this research is to assess the extent of knowledge regarding systematic investment plans (SIP) among employees in the information technology (IT) sector. Additionally, it seeks to explore the impact of demographic factors on their participation in these investment plans. The main aim of this research is to investigate the impact of individuals' awareness of systematic investment plans (SIPs) on their investment decisions. The main aim of this study is to assess the feasibility of Systematic Investment Plans (SIPs) within the Indian context, taking into account the diverse range of issues, complexities, and factors associated with them. Furthermore, the objective of this study is to present strategies and methodologies that can be utilized to effectively tackle the obstacles related to the establishment of mutual funds in accordance with the economic growth prospects of the nation.

The initial section of the study provides a comprehensive overview of the contextual background and the imperative for conducting the study. The subsequent section of this study centers on the comprehensive examination of existing scholarly works and publications. The third section of the paper outlines the research methods employed, while the fourth section provides an exposition of the study's findings. The final segment of this study culminates with a discussion on the limitations encountered during the research process and outlines potential areas for future investigation.

REVIEW OF THE LITERATURE

Mutual funds' expansion and financial success have been the subject of a great deal of study in both developed and developing countries in recent years. The following research papers have made substantial contributions to the examination of mutual fund performance within the context of a systematic investment strategy, as evidenced by brief abstracts of the full publications provided. Malkiel, B.J. (1995) claims that his research employs a novel data set consisting of annual returns from all equities mutual funds. We can now more accurately gauge performance and the extent of survivorship bias thanks to these numbers. Overall, mutual funds have underperformed their benchmark portfolios, and this is true before and after accounting for management fees and expenses. The effects of survivor bias appear to be larger than those indicated by earlier research. There was also substantial performance persistence in the 1970s, but the returns of mutual funds were more volatile in the 1980s. According to what has been said, "they give an exploratory examination into the investing approaches of mutual funds" (Louis, K.C., &Lakonishok, C.C., 1999). According to Morningstar, mutual fund styles tend to cluster near a broad market benchmark. If the fund's performance deviates from the benchmark, it is more likely to invest in profitable growth companies. There is, on average, some consistency in approach, however underperforming funds are more likely to shift gears. Some research suggests that growth funds perform better than value funds when comparing style adjusted performance. The results of the style identification method remain unchanged, but a strategy based on the features of the funds'

portfolios greatly outperforms it in predicting future returns. "the stock market generates larger returns than any of the investment choices available in the financial market," K.P. Sindhu and S.R. Kumar (2008) wrote. The stock market is a dynamic and potentially lucrative arena for the astute investor. However, substantial risk and uncertainty may be present. The bigger the possible gain, the greater the possible loss. Those who lack knowledge and expertise when it comes to investing in financial assets, especially securities, run the risk of losing money. As will be discussed further below, this is where mutual funds come in. Most people should put their money into mutual funds since they offer low minimum investments and the chance to invest in a professionally managed, diversified portfolio of assets. To achieve the goals of its investors, whether they be income, capital growth, or a combination of the two, a mutual fund is a type of investment company or trust that pools the resources of many shareholders and invests on their behalf in diversified portfolios. Therefore, mutual funds have become an important investment vehicle for pooling money, especially from the small and household sectors, with the aim of investing in the securities market. Mutual funds are becoming increasingly important in India's capital market as the country's middle class expands its pool of disposable income. Investors in mutual funds nowadays have a wide range of options available to them. However, putting money into mutual funds is something you should plan on doing for the long haul. Therefore, knowing how long they plan to invest for is essential. This article looks at the participants' investment horizon by analyzing their quarterly investment targets and holding periods. Sharma,P.(2010): Thus, the authors of this piece found that the mutual fund market is continually becoming more efficient as it offers investors more desirable options. The mutual funds industry is quick to adapt and understands the perspective of investors, but it is still in a constant "race to the bottom" to differentiate its products in reaction to the economy's volatility. S. Singhal& M. Goel. (2011, July). The empirical results showed that SIP plans generated higher returns than one-time investments. According to Shelly Singhal (2011), Systematic Investment Plans (SIPs) are one of the most successful financial innovations that have emerged at a reasonably fast rate in emerging economies, with India being no exception. According to Dr. Ravi Visa (2012), investors were still primarily putting their money in banks and post offices because mutual funds were not widely known. According to Dr. Ravi Visa (2012), the average investor only stayed in a mutual fund for three years before pulling their money out because the fund wasn't performing well enough. Most investors choose either a SIP or an equity option as their investment vehicle. It was also shown that most investors put their trust on their broker or agent to evaluate the dangers of their investments rather than doing it themselves. According to PAUL, T. (July 2012), the organizational frameworks of mutual funds have evolved over time to reflect changes in the economic and financial systems and the regulatory environment in which they operate. Consumer demands and changes in investor perspectives and expectations have both had a role in the introduction of new products. Experts in marketing place a premium on learning what their investors anticipate and then consistently outperforming those projections. According to Amarnath, B., Dr.Reddy, R.S., and Krishna, K.T. (2012), these obstacles can almost certainly be overcome through collaboration among the three stakeholders (investors, fund managers, and regulators) if there is widespread agreement that appropriately regulated Mutual Fund activity can play a significant role in financial development in all of its dimensions. Tahseen, A.A., and Narayana, S. (2012) point out that consumers' limited risk appetite, which may be attributed to both cognitive and emotional components of attitude, has long been a challenge for financial institutions. Lack of awareness in rural and semi-urban areas is cited by several academics, including Kandpa and Kavidayal (2013a), as the explanation for the concentration of mutual fund investing in large

metropolitan areas. Lack of marketing operations for mutual funds has only made a bad situation worse, adding to the market's lack of product variety and confusion. Mutual fund agents and distributors play a crucial role in educating the investing public. This has resulted in a relatively contained mutual fund market. According to Vyas, R. (2013), mutual fund firms should actively seek out investor input during the portfolio creation process. Mutual fund firms should encourage investors to seek out proper advice in order to better comprehend the terms and conditions of various mutual fund schemes. Mutual fund companies should actively promote this type of fund design since it guarantees complete investor support. Several academics, notably P.P. Juwairiya (2014), argue that a systematic investment plan is the best option for low-net-worth individuals who wish to invest modest amounts on a regular basis in order to amass wealth over time. Mutual funds are "a type of investment that pools money from a large number of participants to invest in stocks, bonds, and other types of investments, with the fund management deciding how the money is invested," as stated by Kumar, S., and Kumar, V. (2014) in their research. According to Goswami, A.G. (2014), a mutual fund investment is a diversified portfolio of securities that may include equity securities (such as common and preferred shares), debt securities (such as bonds and debentures), and other financial instruments issued by corporations and governments. Investors get the most out of their mutual fund investments because of the diversification, professional management, and low transaction costs associated with reinvesting capital gains and dividends. Management of regional investment projects consists of researching and evaluating their efficacy, as stated by Azzheurova, K.E., and Bessonova, E.A. (2015). It affects factors like the rate of development and the ability to solve regional socioeconomic issues. This research proves that functional units that examine the projects' effects on society, innovation, and the environment need to be added to the assessment algorithm of regional investment projects. (Feb 2015): A Systematic Investment Plan (SIP) has been found to help mitigate risk during times of market volatility. A. Romeo, M. Tehna, and G. Joseph. As was previously indicated, SIPs are preferable only in bear markets, while lump sums produce large returns only in bull markets. According to the results of this research, a minimum investment horizon of five years is required to maximize returns from SIP. According to Prabhakaran, V. (Sep 2015), the stock market is a key economic indication of a country's overall economic health. A growing number of people are buying stocks due to the market's recent upswing. Many investors do their own trading, but they still rely on experts for advice on where to put their money. Fund managers need to know a lot of things about their investors, but one of the most important is their tolerance for risk. Sharma,R.(2015) His study's overarching goal is to learn what kinds of mutual fund strategies certain groups of investors favor and why they use such strategies. Findings suggest that high returns, security, and tax advantages are the key draws to mutual fund investments. The study also found that expansion plans and balanced schemes are the most preferred types of schemes. There is little variation in the percentage of male and female responders with different levels of investment experience. Respondents with a college or university degree are less experienced than those with other academic credentials. When looking at people's knowledge of investing based on their career, it turns out that military and professionals are among the least knowledgeable groups. In his 2015 article, Sharma, S. discussed exchange-traded mutual funds (ELSS). A type of mutual fund, the Equities Linked Savings Scheme (ELSS) invests its capital in stocks and other equity-related financial instruments. According to specific sections of the Indian Income Tax Code, these schemes offer investors tax rebates. Since ELSS is a continuous service, users can join or leave at any time.

RESEARCH METHODS

The study relies on primary data. A range of secondary sources, including books, journals, magazines, and websites, were consulted to acquire information pertaining to the operation and functionality of SIPs. The primary dataset was obtained through an online survey administered to participants. The survey utilized a structured questionnaire created with Google Forms and subsequently uploaded to the database. The collection of primary data involved the utilization of a convenience sampling method. A sample size of 110 respondents was selected from the Bengaluru IT sector based on their voluntary willingness to participate in the study.

The study encompasses both exploratory and descriptive methodologies. The utilization of tables and diagrams is prevalent in this context. The examination and interpretation of the obtained data are facilitated by the utilization of visual aids such as bar graphs and pie charts, which enable a comprehensive understanding of the data through descriptive analysis. The analysis was conducted using the Statistical Programme for Social Science (SPSS), which involved employing ANOVA tests to ascertain the significance of the relationship between multiple independent factors and the dependent variables, among other analytical procedures. The present study employs the AMOS Software to perform a structural equation model in order to examine the influence of SIP awareness on investment decision-making.

RESULTS AND DISCUSSION

Chart 1- Demographic variables of the respondents
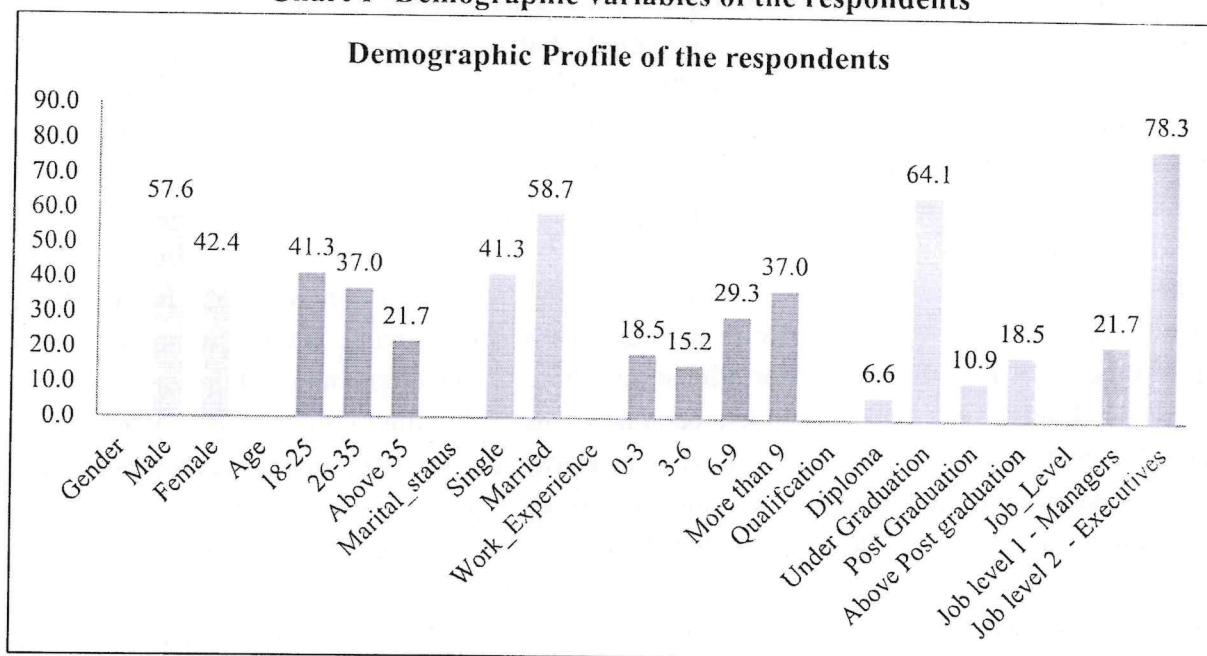
The demographic profile of the respondents is clearly depicted in Chart 1 of this report. The majority of research participants are male, and the majority of IT employees are under the age of 35. In addition, 58.7 percent of respondents are married. A look at the level of experience found that more than 70% of workers had less than 9 years of experience and that the remaining 30% had just completed their undergraduate degree. Approximately 52 percent of employees make between Rs. 15,000 and Rs. 30,000 per month, with 48 percent earning between Rs.30,000 and Rs.45,000 per month. In view of the demographic profile, it is clear that the respondents are young and varied, with a wide range of

experience and educational degrees. The earnings of IT employees fall into the Middle-income group, which is consistent with the study's requirements.

Chart 2 - Awareness of IT Employees on SIP

Awareness of SIP among IT Employees
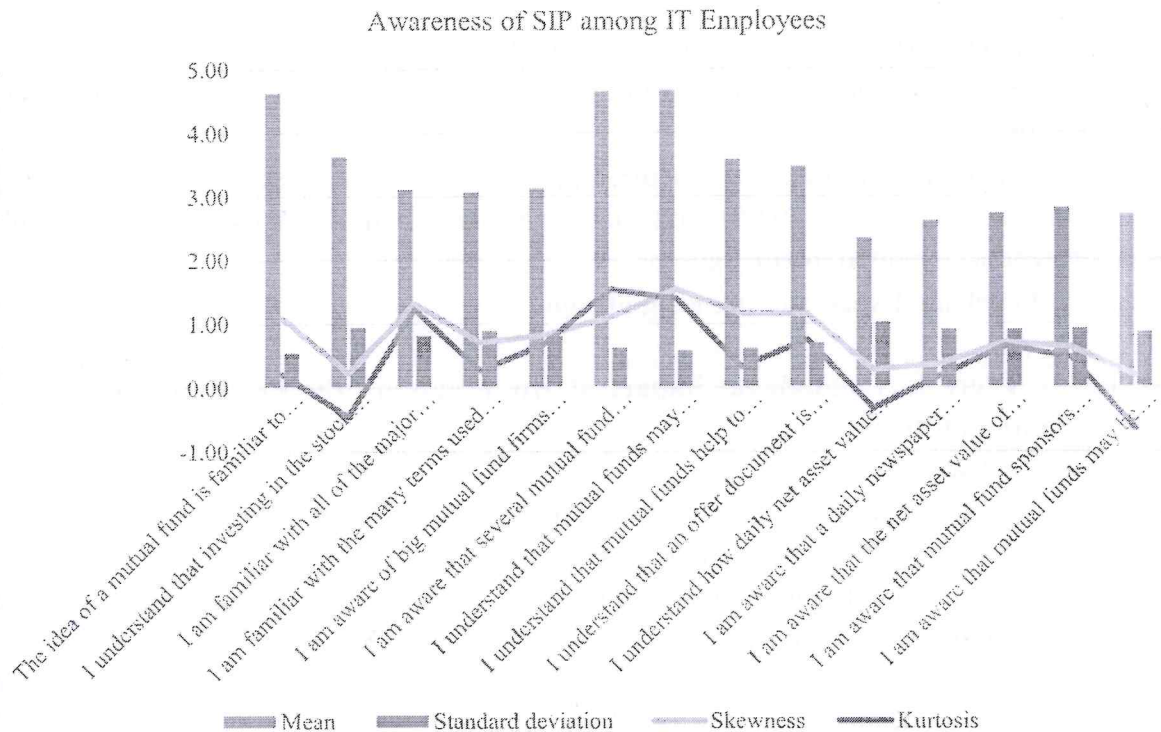
The descriptive statistics show that the IT Employees are aware of the idea of a mutual fund, several mutual fund programmes offer tax advantages and mutual funds may help with both capital growth and monthly income with a Mean of above 4.000 and standard deviation below 1.000. The skewness and Kurosis are within the acceptable range and indicate that the responses are skewed towards the left of disagreement side. Hence, on an overall basis the IT Employees are aware of the SIP funds, but they have a limited understanding of how the SIP investments are structured and operate.

Hypothesis – There is a significant impact of demographic variables on the investment decision related Systematic Investment Plans

Table: 1 ANOVA and Independent T test –Awareness of SIP

Dependent variables	Influence of demographic variables on Awareness of SIP (F statistics and Significance Values)					
	Independent T test - Independent variables			ANOVA – Independent Variables		
	Gender	Job level	Income level	Age	Experience	Qualification
F Statistic	0.991	0.983	18.334	21.941	1.409	13.287
Significance Value	0.739	0.106	0.006	0.000	0.710	0.001

The test results show that there is a significant impact of demographic variables on the Awareness of SIP Funds.

- In case of Age, there is a statistically significant difference in awareness based on age at $F= 21.941, p= 0.000$ and those who are in age group of 25-30 years have greater awareness compared to other groups
- In case of Income levels, there is a statistically significant difference in awareness based on income levels at $F= 18.334, p= 0.006$ and those who earned above 30,000 have greater awareness compared to other groups
- In case of Qualification, there is a statistically significant difference in awareness based on qualification at $F= 13.287, p= 0.001$ and those who have completed their Post-Graduation have greater awareness compared to other groups
- Gender, Job Level and Experience are insignificant

Hypothesis 2 – There is a significant impact of Awareness on the investment decision related Systematic Investment Plans

Step -1 Exploratory Factor analysis

There is statistical significance according to the KMO measure of sample adequacy (0.911) and Barlett's Test of Sphericity (5% significance threshold). According to chi-square analysis, the correlation matrix does not appear to be an identity matrix and appears to be factorable; the Bartlett test's Chi-square value is 29871.99, with a significant value less than 0.05 and 190 degrees of freedom.

Communalities, which are the extraction values for each item, should be greater than 0.300. The stress items had communalities ranging from 0.562 to 0.385.

The sum of all the squared loadings that were removed amounts to approximately 67.33% of the initial loadings. An acceptable cumulative Rotation Sum of Squared Loadings in the social sciences is greater than 50%. The study found that when using the Factor Analysis technique, two components were found. Thanks to the correct factor loadings, no items were removed from the investigation, as shown by the rotated component matrix. There were five items on the functional awareness construct and five on the instrument awareness construct.

Step -2 Run the model

Table 1 - Measurement Model – impact of Awareness on the investment decision related Systematic Investment Plans

Model Fit Summary				
CMIN				
Model	NPAR	CMIN	Degrees of Freedom	CMIN/DF $(\chi2/df)$
Default model	126	412.997	163	2.523
Criteria				<3.000
RMR, GFI				
Model	RMR	GFI	AGFI	PGFI
Default model	0.039	0.916		
Criteria	<0.100	>0.80		

Key metrics for evaluating model fit are shown in the table above. The acceptable range of 3 is 2.523, which is the result of dividing the chi-square by the degrees of freedom ($\chi 2$ / df). Compared to the suggested characteristics, the actual Goodness of Fit rating is higher at 0.916. A result of 0.039 for the RMR is produced by the boundary estimate. Not only does this model have good fit metrics, but it has also received a lot of praise from academics.

Table 2- Structural relationship model – Impact of Awareness on the investment decision related Systematic Investment Plans

			Unstd Estimate	Std Estimate	P values
Investment_decision	<---	Instrument_Awr	0.534	0.231	***
Investment_decision	<---	Functional_Awr	0.655	0.289	***

The results of SEM Analysis illustrate (Relationship between variables of unstandardized estimates)

- When Instrument awareness goes up by 1, the Investment decision goes up by 53 times (B=0.534 , b = 0.231) and this relationship is statistically significant at p<0.05
- When functional awareness goes up by 1, the Investment decision goes up by 65 times (B= 0.655, b = 0.289) and this relationship is statistically significant at p<0.05

The results of the SEM analysis show that there is a significant impact of SIP awareness on the investment decision of the IT employees.

SIP should be promoted to the public through commercials and other promotional efforts in order to raise awareness. Seminars, conferences, and training programmes should all be organised to achieve this goal, among others. In order to increase the knowledge of SIP investments among company owners, self-employed individuals, farmers, and other members of the middle-income group, appropriate guidelines must be made available. As women's educational attainment continues to rise, companies should tailor their investment plans specifically for them. Women's participation in the planning and decision-making processes for selecting investment alternatives should be promoted as well. Companies should promote Systematic Investment Plans, particularly among persons living in rural regions and those who do not have a lot of money, in order to help them build wealth. The businesses should target an increasing number of young investors as well as individuals who are nearing the end of their careers. Institutional agencies should develop new promotional and marketing methods that are both unique and appealing to their target audiences.

CONCLUSION

Systematic Investment Plans (SIPs) play a crucial role in mitigating risk factors associated with conventional financial instruments. By shielding investors from market volatility, SIPs enable them to maximize the advantages derived from their investments. This is achieved through the regular and consistent nature of SIPs, which remain unaffected by prevailing market conditions. Systematic Investment Plan (SIP) presents an optimal choice for small-scale investors seeking to allocate modest amounts of funds at regular intervals, with the objective of amassing wealth over an extended duration. The practice of regular saving is promoted while discouraging activities such as market timing and speculation, among other factors. India, being a nation characterized by a substantial proportion of individuals falling within the medium income category, ought to actively endorse and facilitate the adoption of Systematic Investment Plans (SIPs) as a means to engage in long-term investment endeavors. A considerable number of individuals may have refrained from investing in Systematic

Investment Plans (SIPs) due to a dearth of information, notwithstanding their financial capacity to allocate funds towards such investments. Certain investors hold the belief that mutual fund investments carry inherent risks, notwithstanding the fact that these investments consistently yield substantial returns when held for an extended duration. Investors exhibit a preference for fixed deposits in banks due to their comparatively lower level of risk. The information technology employees possess awareness regarding the existence of SIP funds, yet they possess limited understanding regarding the operational mechanics of SIP investments. The decision to choose SIP Funds is influenced by Age, Income, and Qualification, with these factors having a notable impact.

In conclusion, drawing from the findings of the conducted research, it can be inferred that mutual funds Systematic Investment Plan (SIP) is an investment strategy that allows investors to allocate a fixed amount of money into mutual funds on a monthly basis, following a predetermined schedule. This investment strategy serves to safeguard the investor against market volatility and guarantees the attainment of the highest possible profit by consistently making investments, irrespective of prevailing market conditions. Systematic Investment Plan (SIP) is a specialized feature designed to cater to investors who exhibit a preference for making modest monthly investments with the objective of accumulating wealth over an extended duration, typically for purposes such as retirement funds. The practice of regular savings is promoted while discouraging activities such as market timing and speculation, among other factors. According to the findings, the study would provide advantages for individuals with limited investment resources who aim to participate in the capital market by utilizing a Systematic Investment Plan. Systematic Investment Plan (SIP), similar to other investment avenues, possesses certain limitations; however, it remains a highly favorable choice for long-term investment, especially for novice investors and individuals with fixed incomes.

Limitations of the study

Any investigation is constrained by inevitable restrictions such as time, money, and resource availability, which limit the scope of the investigation. Obtaining initial investor information presents several challenges, particularly owing to a lack of technical efficiency and poor questionnaire literacy among the participants. Because of a lack of expertise of econometric methods, it is extremely difficult to draw useful inferences from the data that has been collected. Typically, conclusions from tiny studies are not applicable to the wider population, as a result of the limited sample size of the study.

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Determinants of Digital Payments: An Empirical Study with Reference to Bangalore City

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Article Info

ABSTRACT:

Propelled by recent policy initiatives and technological developments, India's digital payment system is a promising success story in the making. In recent decades, the country has seen a significant increase in the use of digital payments. A digital payment, also known as an electronic payment, is the transfer of value from one payment account to another using a digital device such as a mobile phone, POS, or computer, as well as a digital communication channel such as mobile wireless data or SWIFT.The research sheds light on the multifaceted factors that have contributed to this surge, ranging from government initiatives promoting a digital economy to the safety concerns arising from physical contact-based transactions. This has propelled UPI's rapid adoption over traditional modes of payment within the Bangalore city. While highlighting the positive outcomes of this innovation effervescence, the study also delves into the challenges hindering a seamless transition. These challenges encompass technical intricacies that might impede user experiences, infrastructural gaps affecting accessibility, security apprehensions among users, awareness gaps, and issues related to the reliability of UPI transactions. The study has found statistically significant associations between age, occupation, e-wallet usage, and opinions on promoting cashless payments concerning respondents' preferred factors for online payment apps.

Keywords: Digital Payments, Covid-21, Pandemic, POS, Mobile wallets.

1. Introduction

The consensus around the origin and the forms of ancient money has kept changing over the course of recorded history. But, what has not changed over the years is what money does; broadly, it facilitates trade in goods and services as medium of exchange and acts as a credible store of value. Modern day trade demands massive payments to be settled fast over long distances with minimum transaction cost. Evidently, to suit these needs the payment systems are being digitized globally. Cash, however, remains a crucial part of the trade. Therefore, the discourse on the current age payment system revolves around cash vs digital transactions. A digital payment, often known as an e-payment, is a method of making electronic payments between a payer and a payee. Both the payer and the payee use digital modes to complete the transaction. Right from barter system to paper money, there has been a huge evolution in the modes of payment in India. And now in the second decade of the millennium with the youth and coming generation, cashless i.e., digital payment mode is the new phase of payments. Before the evolution. The basic concept of traditional banking was that the users have to go the bank for the primary banking requirement such as withdrawal or deposit of cash, funds transfer, verifying statement of accounts etc. It has been called as the original banks which was the method of past in the economy. They were the original commercial mediators to provide bank accounts. From the exterior they had the big buildings with pillars made by marbles but in the interior, it had an abundance of money in the box. This has been called "Bank". They were big athletes in the commercial markets. They converted the savings of the house into loans for business as an investment. Traditional Banking designed on IT acceptance. The Indian Banking Sector arose in the world of technology in the beginning of 1990s.InIndia public sector banks have been influenced by the banking sector, which occupied above 80% base of total asset.(Gupta & Gupta, 2020).

Overall, the Indian economy has witnessed a remarkable transformation towards a digital and cashless payment ecosystem, driven by the government's initiatives, the efforts of various stakeholders, and the increasing popularity of mobile wallets and payment apps. As the digital payment landscape continues to evolve, it is expected to further boost financial inclusion and pave the way for a more efficient and convenient mode of conducting transactions.

2. Literature Review

Venkatesh and Morris (2000) where they found that men placed a greater emphasis on "usefulness" while women placed a greater emphasis on "ease of use" in determining Intention to Adopt. In the case of mPayment, while the usefulness of mPayment can be established by its increased transaction speed and convenience, the process of using mPayment has not been proved to be straightforward or trouble-free. Therefore, the lower female intention to adopt may be partially attributed to providers' inability to demonstrate the ease of use of mPayment systems. This finding is also consistent with prior studies that have found gender to be an important moderating variable in the context of e-commerce.

Bellman, et al., (1999) found in their study that consumers' digital lifestyle traits were better predictors of online buying behaviours than demographics; therefore, four technology related traits, length of cell phone use, frequency of shopping online, technical ability, and self-reported new technology adopter category, were also included in the study.

M. C. Joshi,(2017) With the commencement of the Digital India initiative in 2015, the Indian government pushed hard for the adoption of cashless transactions. It was a

campaign to urge Indian businesspeople and citizens to embrace digital technology in their daily lives in order to boost the country's economy by facilitating paperless, anonymous, and cashless transactions. Various means of digital payment have been made available under the national payment corporation of India (NPCI) in order to encourage cashless transactions and convert the entire country into a cashless India.

Shamsher, Rana, (2017) The demonetization resulted in unprecedented growth in digital payments. By February of this year, digital wallet companies had grown by 271 percent. government and private sector companies such as Paytm, Freecharge, and Mobikwik have been aggressively pushing several digital payment applications, including the Aadhaar Payment app, the UPI app, and the National Payments Corporation of India (NPCI) developed the Bharat Interface for Money (BHIM) app. Digital transfers using apps have brought behavioural change and helped in the adoption of digital payment. This has resulted in the ease of money transfer in rural areas which was not touched earlier by the digital payment method. Many foreign investors now want to invest in the digital payment industry, which isa new attractive destination because of the scope of tremendous expansion in India.

Soat, (2018) customers in the Asia- Pacific region had the highest degree of trust and enthusiasm for utilizing mobile devices for e-transactions. Businesses have significantly benefited from digital payment methods, while consumers have increased their use of mobile devices for daily activities in recent years.

Madan (2021) High internet connectivity, mobile data accessibility, a robust wireless network, an inclination toward new and innovative technology, the digital India policy, and different financial inclusion initiatives are just a few of the significant factors driving the increased use of mobile payments in India.

Ramachandran et al. (2018) explores the factors influencing consumer trust and adoption of digital payment systems in India. The research highlights the importance of security features, such as two-factor authentication and encryption, in building customer trust and encouraging participation in digital transactions.

Bhattacharya (2020) investigates the relationship between financial literacy and the adoption of digital payment methods among Indian consumers. The research underscores the need for educational campaigns and awareness programs to enhance financial literacy and enable customers to make informed decisions regarding digital payment adoption.

Rana, (2017) analysed customer perception and the impact of demographic factors on the adoption of a digital mode of payment. For the study, they collected primary data from 150 respondents from different parts of Delhi. They found that demographic factors, except education, do not have much impact on the adoption of digital payments. ANOVA computation supported this finding as there was no significant difference perceived by the respondents on the basis of gender, age, profession, and annual income. It indicates that adoption of digital payment is influenced by the education level of the customer. If a person has studied beyond matriculation, he or she will be inclined to use the digital payment mode. It was also found that in areas where the education level is high, such as Delhi NCR and other metropolitan areas, the possibility of acceptance of digital payment is much higher. The increased use of smartphones and internet penetration in such areas aided in the adoption of digital payment.

Adharsh et al., (2018) found in the study of "Transformation towards E-wallet payments Systems pertaining to Indian Youth "that there are approximately 80.5 million users of digital wallets in India and the major group who uses the digital wallet services is the youth. The objective of the researcher is to analyze the impact of digital payments after demonetization on the daily expenses of students, for which they have conducted a survey by asking various questions to a sample size of 160 respondents.

They found that approximately two-thirds of youth use mobile recharges and ticket bookings from online modes as it's less time-consuming and more convenient to make transactions. They also noted that various cash backs, freebies, loyalty points, or redemptions attract them to make digital payments and avail the best offers out of them

Research Gap

The research gap identified in the context of mobile banking growth during COVID-21 in India is the lack of financial inclusion and technological barriers faced by certain households. The findings suggest that many households were unable to use digital payments due to the absence of financial accounts for making or receiving payments. Additionally, a lack of home internet connectivity was a significant hindrance for these families, despite having bank accounts or prepaid cards. This gap indicates that while there has been considerable growth in mobile banking and digital payments during the COVID-21 pandemic, a segment of the population is still excluded from participating in these digital financial services. The inability to access the internet from home becomes a limiting factor for using mobile banking services, which often rely on online platforms for transactions. According to this report, UPI acceptance is expanding faster than other ways of payment among consumers in Bangalore city.

Objective of the Study

- To study the impact of Digital payments
- To analyses the mode of payment and problems faced by them while during online payment at the time of Covid 21 in Bangalore city.
- To suggest the challenges faced while Covid 21 on Digital payments in Bangalore city.

3. Research Methodology

The study on mobile banking growth during COVID-21 in India is descriptive and analytical, as it seeks to explore and understand the impact of the pandemic on mobile banking services and the shift from traditional banking to mobile banking.

The descriptive aspect of the study involves providing a detailed account of the changes and trends observed in mobile banking usage during the COVID-21 period. It examines the growth rates, adoption patterns, and usage behavior of customers regarding mobile banking services. This descriptive analysis helps in presenting a comprehensive picture of the transformation in the banking sector due to the pandemic.

The analytical aspect of the study involves deeper investigation and interpretation of the data collected. It aims to identify the factors that contributed to the surge in mobile banking usage during the pandemic. This analysis may include identifying the specific demographics or regions that experienced the highest growth in mobile banking, understanding the motivations behind customers' shift towards digital banking, and exploring the challenges and opportunities faced by banks and customers during this transition.

The study uses a mixed-method approach, which involves collecting and analyzing both primary and secondary data. Primary data is gathered through surveys, interviews, or observations directly from customers, banks, or other relevant stakeholders. This may include data on customer preferences, usage patterns, satisfaction levels, and challenges faced during mobile banking adoption. Secondary data is sourced from existing literature, reports, and publicly available data related to mobile banking, the banking sector, and the impact of COVID-21 on the economy. This data can provide context and additional insights to complement the primary data collected in the study.

By using both primary and secondary data and employing a mixed-method approach, the study can provide a more comprehensive and nuanced understanding of the impact of COVID-21 on mobile banking growth in India. The descriptive and analytical components help researchers and policymakers gain valuable insights into the transformation of the banking sector and the implications of increased mobile banking adoption for the future of banking services in the country.

Sample Size and Sampling Method: The study collected data from 138 respondents out of a total sample size of 170. The sample selection was conducted using a simple random sampling approach, ensuring that each member of the population had an equal chance of being selected for the study.

Data Collection: The study gathered primary data through a questionnaire administered to the selected respondents. The questionnaire likely covered aspects related to mobile banking usage, preferences, challenges faced, and overall experiences during the COVID-21 pandemic. Additionally, secondary data was gathered from various sources, such as newspapers, periodicals, and websites, to provide context and support the findings.

Data Analysis: To analyze the data collected from November 2022 to April 2024, the study employed relevant statistical methods such as the t-test, Chi-square test, and ANOVA test. These statistical tests helped in drawing conclusions and identifying significant relationships or differences in the data. By combining both descriptive and analytical approaches and utilizing primary and secondary data, this study aims to provide comprehensive insights into the growth and impact of mobile banking during the COVID-21 pandemic. The statistical analysis of the data enables researchers to draw meaningful conclusions, make comparisons, and identify trends, contributing to a more robust understanding of the subject matter. However, it is essential to acknowledge the limitations of the study, such as potential biases in the sample and the scope of the research

Different Variables With Reference To Demographic Factor of the respondents

Age	No of Respondents	Percentage	Df	Significance Number
Below 30	64	46		
31 – 40 years	37	27		
41 – 50 years	12	9	0.2	0.536
51 and Above	5	4		
Total	118	100		

Gender	No of Respondents	Percentage	Df	Significance Number
Male	87	63		
Female	48	35	0.2	0.007
Transgender	3	2		
Total	138	100		

E-wallet usage	No of Respondents	Percentage	Df	Significance Number
Male	91	66		
Female	44	32	0.2	0.006
Transgender	3	2		
Total	138	100		

Promoting cashless payments	No of Respondents	Percentage	Df	Significance Number
Male	105	76		
Female	33	24	0.2	0.004
Transgender	0	0		
Total	138	100		

Paired T-test for mode of payment at time of Covid - 21

Factor for Paired Samples Correlations		N	Correlation	Sig.
Pair 1	Medicines & Medicines	138	0.610	0.00
Pair 2	Vegetables/Fruits & Vegetables/fruits	138	0.513	0.02
Pair 3	Groceries & Groceries	138	0.732	0.01
Pair 4	Bill payments & Bill payments	138	0.432	0.01
Pair 5	Others/Others	138	0.522	0.02

Factor	Mean	SD	Std Error mean	95% Confidence level		t	df	Sig. level
				Lower	Upper			
Medicines	-.161	.501	.031	-.179	-.043	-3.228	119	0.00
Vegetables/Fruits	-.134	.424	.044	-.176	-.055	-3.076	119	0.01
Groceries	-.117	.519	.032	-.155	-.071	-3.151	119	0.02
Bill payments	-.132	.431	.037	-.175	-.032	-2.703	119	0.05
Others	-.177	.522	.039	-.116	-.037	-2.703	119	0.02

The above table reveals the relationship between mode of payment at time of Covid 2021 for Medicines ,vegetables/fruit, groceries, bill payments, others category of payments are less than the table value. It concludes that there is a significant difference of mode of payment at time of Covid 2021

Chi square test for factor online payment site preferred by the respondents

Pearson Chi-Square	Value	df	Significance
Age	54.274a	20	0.00
Gender	22.699a	5	0.02
E-wallet usage	19.797a	15	0.04
Promoting cashless payments	26.652a	25	0.02

Based on the information provided in the table, it appears that the study conducted statistical tests to analyse the association between respondents' preferred factors for online payment apps and various demographic variables. The significance level (often denoted as α) in this context is set at 0.05, which is a common threshold used to determine statistical significance.
Age: The computed p-value for age is 0.000, which is less than the significance level of 0.05. This indicates that there is a significant association between respondents' age and their preferred factors for online payment apps.
Occupation: The computed p-value for occupation is 0.000, which is less than the significance level of 0.05. Hence, there is a significant association between respondents' occupation and their preferred factors for online payment apps.

Gender: The computed p-value for gender is 0.02, which is more than the significance level of 0.05. As a result, there is no significant association between respondents' gender and their preferred factors for online payment apps.

E-wallet Usage: The computed p-value for e-wallet usage is 0.04, which is less than the significance level of 0.05. Thus, there is a significant association between respondents' e-wallet usage and their preferred factors for online payment apps.

Promoting Cashless Payments: The computed p-value for promoting cashless payments is 0.02, which is less than the significance level of 0.05. Consequently, there is a significant association between respondents' opinions on promoting cashless payments and their preferred factors for online payment apps.

In summary, the study has found statistically significant associations between age, occupation, e-wallet usage, and opinions on promoting cashless payments concerning respondents' preferred factors for online payment apps. However, no significant association was observed between gender and preferred factors for online payment apps in this analysis.

ANOVA for E-wallet usage, promoting cashless payments of respondents

Factor	Variable	Sum of Squares	df	Mean Square	F	Sig.
Medicines	Between Groups	2.102	5	.410	.790	.389
	Within Groups	101.15	114	.453		
	Total	103.25	119			
Vegetables/Fruits	Between Groups	1.765	12	.138	.230	.853
	Within Groups	94.831	107	.479		
	Total	96.596	119			
Groceries	Between Groups	1.102	3	.323	.696	.453
	Within Groups	121.15	116	.343		
	Total	122.25	119			
Bill payments	Between Groups	1.102	5	.207	.715	.440
	Within Groups	95.148	114	.267		
	Total	96.25	119			
Others	Between Groups	2.102	2	.172	.340	.829
	Within Groups	99.148	117	.431		
	Total	101.25	119			

The table shows the significant difference between for E-wallet usage, Promoting cashless payments of respondents as per acceptance of significant value ie (p> 0.05), purchasing and payment mode for Medicines Vegetables/Fruits, Groceries, Bill payments, others are not significant associate between for E-wallet usage, Promoting cashless payments of respondents.

Suggestion

Based on the findings from the study on the growth of mobile banking in India during COVID-21, several suggestions can be made to address the identified challenges and capitalize on the opportunities presented by digital payments:

Improve Server and Connectivity: Banks and digital payment apps should invest in robust server infrastructure and ensure seamless connectivity to minimize disruptions in digital payment services. This will help enhance the overall user experience and instill confidence in customers.

Enhance Customer Awareness: Regularly educate customers about new features, updates, and security measures through various communication channels. Providing up-to-date information will empower users to make informed decisions and use digital payments more confidently.

Organize Customer Workshops: Conduct workshops or webinars to engage with customers directly and address their concerns. These sessions can be used to clarify doubts, demonstrate new features, and provide solutions to common issues faced during digital transactions.
Promote Security Awareness: Educate customers about common fraud and scam tactics, advising them not to share sensitive information like OTP, PIN numbers, or banking details with anyone. Encourage the use of AI tools to detect and prevent fraudulent activities.
Invest in AI-Driven Security: Banks and digital payment apps should continuously improve security measures by leveraging AI tools and technologies. These tools can help detect suspicious activities and provide real-time fraud prevention, enhancing the overall safety of digital transactions.

Focus on Age-Specific Targeting: As the study highlights the high usage of digital payments among respondents aged 20-45, banks and payment apps can tailor their marketing and user interface to cater to this age group's preferences and needs.
Popularize Preferred Payment Methods: Given that respondents prefer Paytm and Google Pay, banks and payment apps can collaborate with these platforms and offer incentives to encourage more users to adopt digital payments.

Address Financial Inclusion and Internet Access: Collaborate with government agencies and telecommunication providers to expand financial inclusion and improve internet access in underserved areas. This will help bring more people into the digital payments ecosystem.
Regular Security Updates: Continuously update and improve security features to stay ahead of evolving cyber threats. Regular security updates can reinforce user confidence in the safety of digital payment platforms.

Emphasize Time-Saving and Security Benefits: Emphasize the time-saving and security benefits of digital payments in marketing campaigns and educational initiatives to attract more users and boost overall adoption.
By implementing these suggestions, banks and digital payment apps can further strengthen the growth of mobile banking and digital payments in India, ensuring a smoother and more secure financial experience for customers across all demographics.

4. Conclusion

The study on the growth of mobile banking in India during COVID-21 reveals several important trends and insights regarding digital payments. The impact of the pandemic has significantly increased the utilization rate of digital payments as contactless transactions became a key preference for safety and convenience.
One of the main challenges hindering the adoption of digital payments is the lack of internet connectivity and financial bank accounts among certain segments of the population. The study also found that a significant shift from cash to digital payments is taking place, with the majority of respondents embracing digital payment methods. The preferred digital payment options are PTM, Google Pay, and E-wallets, primarily used by individuals aged between 20 and 45 years for various financial activities.

However, there is a need for more awareness campaigns to familiarize consumers with different digital payment platforms. Many respondents are limited to using only a few options due to a lack of awareness about other available services. Educating customers about the latest features and benefits of various digital payment methods can encourage wider adoption and improve the overall digital payment ecosystem.

In conclusion, the study highlights the growing importance of digital payments in India and the need for continuous efforts to address connectivity issues, enhance financial inclusion, and promote awareness among consumers. By addressing these challenges, the country can further accelerate its transition towards a more inclusive and digital-centric financial landscape.

Limitations of the Study:

- Some respondents may not be interested in providing accurate information, the information provided by them may be biased.
- Respondent attempted to avoid making a statement. This was one of the most significant restrictions encountered, as it was difficult to analyses and get a correct conclusion.
- The duration of the study for 6 month ie Nov 2022 to April 2024.
- Time was one the constrain to collect the data, when we approach for data collection respondent were not ready to fill the questionnaire for the study.

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Artificial Intelligence in Industry 4.0

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Article Info

ABSTRACT:

Many industry sectors have been pursuing the adoption of Industry 4.0 (I4.0) ideas and technologies, which promise to realize lean and just-in-time production through digitization and the use of smart machines. This shift is driven by technological advances, including Artificial Intelligence (AI) and machine learning, sensor networks and Internet of Things technologies, cloud computing, additive manufacturing, and the availability of large amounts of data that can be exploited by these technologies. However, the adoption of AI technologies for I4.0 varies considerably among industry sectors. This article complements broader reviews of I4.0 by examining the specific applications of AI. The recent White House report on Artificial Intelligence (AI) (Lee, 2016) highlights the significance of AI and the necessity of a clear roadmap and strategic investment in this area. As AI emerges from science fiction to become the frontier of world-changing technologies, there is an urgent need for systematic development and implementation of AI to see its real impact in the next generation of industrial systems, namely Industry 4.0. Within the 5C architecture previously proposed in Lee et al. (2015), the capacity to act specifically while addressing the ideal principle of artificial intelligence is solving the problem and achieving the objective. Finally, the paper identifies and discusses significant applications of AI for Industry 4.0.

Keywords: Artificial Intelligence, Applications, Challenges, Technology, Machine learning

1. Introduction

The recent shift towards customer-driven, highly customized manufacturing as part of the interconnected environment of the Industry 4.0 strategy is making it more and more important for manufacturers to strive for higher agility, productivity and sustainability. According to Tesler's theorem, artificial intelligence is anything that has not yet been finished. For instance, optical character recognition technology has becoming standard technology and are not included in items that are typically thought of as AI. Machines Modern capabilities are currently regarded as artificial intelligence (AI). They are capable of driving cars. autonomously, speech recognition, interactive game systems and simulation of military services sophisticated network routing, etc.

AI was regarded as a legitimate academic field in 1955. It gradually acquired support for upbeat Loss of financing, new methods for increasing success rates, then renewed In the year since, a finance plan was also adopted. The study on AI is classified into two categories in the historical domain. They frequently fail to build theoretical communication between them after subdividing them into subcategories. The subcategories emphasize the technological consideration, which includes deployment tools, objectives, and deep socially based philosophical main ideas.

Expert system research helped to resurrect AI-related research in the early 1980s [18–24]. It is a Using human knowledge and analytical abilities, an AI-based programme. Over time, by 1985, the AI The market had passed the $1 billion threshold. The fifth generation of computer systems was introduced at that time. The resumption of funds was motivated by a project under Japan. Consequently, the value of investing in AI The American and British governments eventually funded research. However, the decline of the Lisp Machine business in 1987 had an impact on AI research [1]. Consequently, the significance of AI was not well regarded by financing organizations.

Artificial neural network (ANN) development was impacted by the creation of Very large scale integration (VLSI) and metal oxide semiconductor (CMOS) technology are complementary. Late 1990s to early 2000s saw the start of AI research in the field of medical diagnosis. Data mining, logistics, and other pertinent fields [26–30]. The importance of the AI field has been contribution from researchers through the use of more powerful computing, cooperation statistics and mathematical models, problem-solving techniques for a particular issue, and Standards of science [2]. World champion chess player Garry Kasparov was defeated by a Deep Blue, a computer software, in 1997. Typically, AI examines the context and takes appropriate action to increase success. Problem solving task frequency. AI's utility and goal functions can be simple for a particular objective or complex within the execution. Industry 4.0 represents the fourth industrial revolution, a new era in manufacturing production. It is based on the use of digital technologies that make it possible to connect people, processes, and objects together, creating an integrated and intelligent system This new revolution, as it spreads and expands thanks to the use of new tools, will not only concern companies but will also involve end

consumers, as they will have the opportunity to become an integral part of the production chain, influencing with their actions and feedback certain production lines.
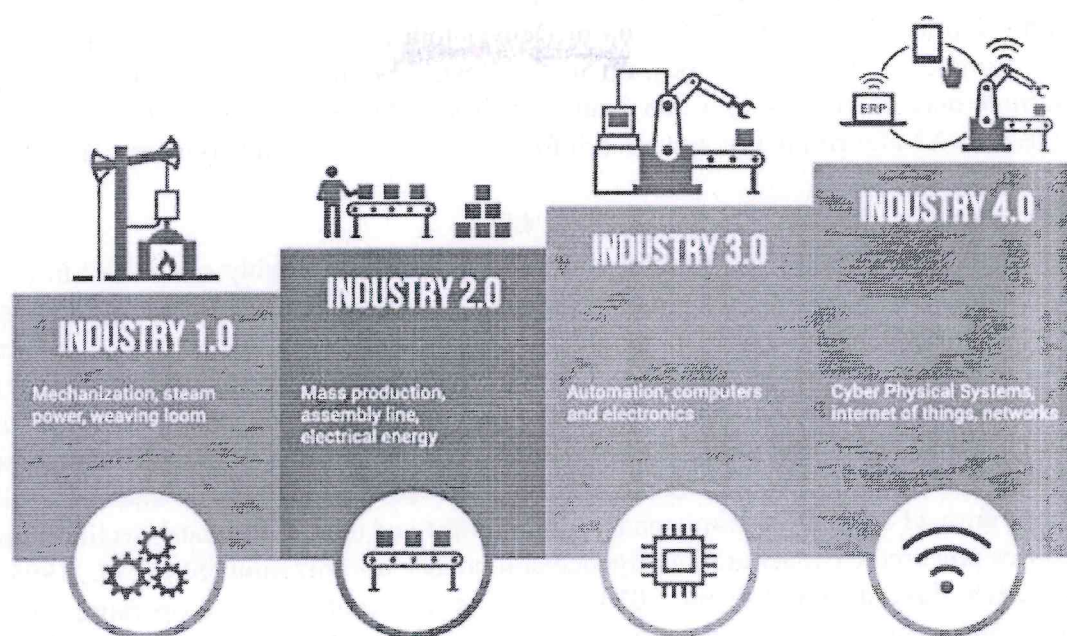

Figure 1: The Four Industrial Revolutions (source: elsist.biz)

Goals for the AI may be stated directly or impliedly. If reinforcement is intended, If a person is learning, they can set it implicitly by giving out points for good behavior or punishing other characteristics. Similarly, It is possible to create an evolutionary system with objectives and mechanisms that will duplicate AI. system for a model based on an animal's task of looking for food. On the other hand, AI systems lack objectives or follow logic and training sets, such as nearest neighbor [3]. During the study community, the creation of standards for such nongoal systems where the purpose is to achieve the categorization of issues, is becoming more popular [3].

Algorithms are used to implement AI. An AI system's algorithm is a collection of instructions that a machine follows. follows. The development of simple algorithms for issue solving is done first, then complicated algorithms. An Tic-tac-toe player example of a straightforward method is covered elsewhere in [7]. The The algorithm's many steps are as follows:

1) Capture the last square if an agent has a "treat," or two squares in a row. As opposed to that,
(2) Play the move if an action has "forks" that can simultaneously create two treats. As opposed to that,
(3) Head to the main square if it's free. As opposed to that,
(4) If the adversary is in a corner, take the opposing corner. As opposed to that,
(5) Hold a vacant corner if one is available. In other situations, head to the empty square. The algorithms built on artificial intelligence are able to process and absorb data. They are capable of resolving issues. either by developing an algorithm on their own or by learning new things. a few deployment techniques Bayesian networks and nearest neighbour can theoretically learn to approximation through decision tree. the mathematical operations that would best clarify the approach to issue solving. They can get the necessary knowledge gained through data mapping and all conceivable hypotheses. Due to the combinatorial explosion, practically Since there are so many different ways to solve an issue, it is

impossible to evaluate them all. Time increases rapidly. The goal of the AI study is to identify practical solutions from a wide variety of alternatives while avoiding those that would not be useful in solving the challenge.

Find the shortest route from a location in Denver to a destination while looking at a map. A good example is New York's location in the East. The traveller can skip seeking for any subterfuge here. Route through San Francisco or significantly to the west. Therefore, the AI may use the A* algorithm as a way search for the traveler's best and shortest route.

Need of artificial intelligence for industry 4.0

Industry 4.0 needs to prepare for networked factories that are highly embedded in the supply chain, design team, production line and quality control into a smart engine that provides practical insights with the help of AI. To exploit Industry 4.0's many opportunities, manufacturers need to develop a system that considers the whole production process as it needs cooperation across the whole supply chain cycle. Today, the main fields of AI, ML and IoT adoption are asset control, supply chain management and resource management. Combining these new tools, asset tracking precision, the visibility of the supply chain and stock utilization can be improved. Predictive maintenance can be improved using ML strategies like algorithms, processes powered by machine intelligence and quality optimization (**Shi *et al.*, 1995; Kunst *et al.*, 2019; Javaid and Haleem, 2020**). Effective time monitoring of operating loads at the factory floor contributing to production planning efficiency can be quickly undertaken using AI. By combining ML with overall equipment effectiveness, producers can increase production, preventive maintenance and asset workloads.

Industry 4.0 readiness

It is crucial for companies to have a deep insight in their degree of digitalization and Industry 4.0 readiness in order to take appropriate decisions for their development. For this task of Industry 4.0 maturity assessment of production, several indices have been created. Increasing levels of maturity may be computerization, connectivity, visibility, transparency, predictability, and adaptability. A maturity index developed by the German FIR institute, together with DFKI and other partners, follows an assess and assist approach that enables companies to set up specific, benefit-oriented I4.0 roadmaps. This approach takes into account the four different structuring forces of companies: information systems, resources, organizational structure, and culture for an enterprise-wide assessment.

The assessment examines relevant core processes of a company and consists of three phases. Evaluation and recommendation are based on the surveys conducted at the enterprise. The results of the survey are transferred and combined to the maturity level radar for the four structuring forces. The analysis of this combined radar identifies the functions and structuring forces where capabilities have to be expanded. It allows for a clear vision of what has to be targeted next by deriving action items for a transformation roadmap to Industry 4.0.
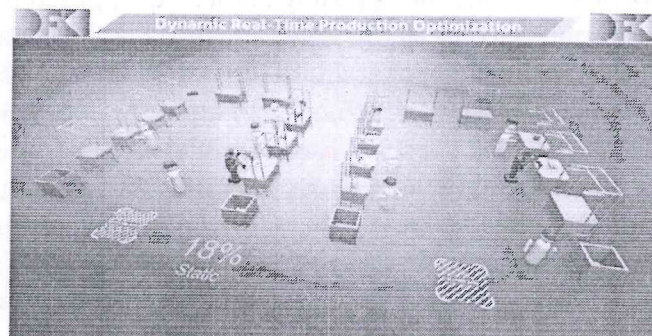
Intelligent software systems

Given a sufficient degree of digitalization as described before, intelligent software systems based on knowledge processing can be employed with AI entering the scene. Being a part of Computer Science, with its aspects of Computational Science and Engineering, AI has also strong links to Cognitive Sciences and, therefore, integrates insights from Linguistics, Biosciences, Psychology, and Philosophy. AI is meant here as Avantgarde Informatics and, in this sense, describes realizing intelligent behavior and the underlying cognitive abilities on computer systems. Knowledge processing covers retrieval, extraction and inference of knowledge as well as its presentation and distribution. Core aspects are the representation and the management of knowledge, deployed by discovery, learning and teaching of (inferred) knowledge. At present, in cognitive systems, we often use hybrid architectures: knowledge bases combined with Machine Learning.
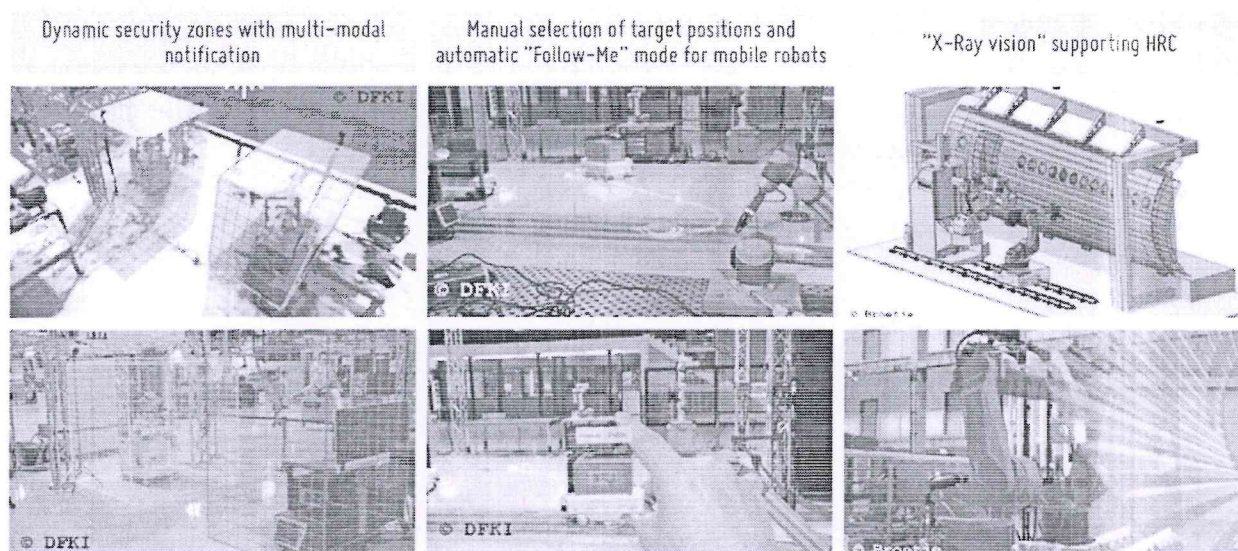
Today's rapidly developing IT environments like Web and Cloud technologies, in-memory computing, and GPU parallel cluster as well as mobile internet, 5G, and Big Data boost AI solutions. Combining AI with Smart Data creates (new) smart products and services. Being collaborative, autonomous, proactive, interoperable, adaptive, self-healing, self-explanatory, self-learning, self-optimizing, and fault-tolerant are the key features of AI systems.

Industry 4.0 based on AI

The key aspects of Industry 4.0 based on AI for the Internet of Things (IoT) must cope with the needs of the manufacturing industry to increase efficiency, handle batch size 1, and apply to the multi-adaptivity required. According to and adapted from Siemens, these needs can be clustered into four core aspects: Modularity, Connectivity, Autonomy, and Digital Twin. Smart Factories are defined by several factors that refer to these core aspects: Dynamic networks of local controllers and anytime planning in real-time are needed for a flexible production configured in response to rapidly changing processes. Self-organization lead to an optimization of production, e.g. through Cyber-Physical Production Systems. Digital Twins of the entire process and its constituent elements are essential to monitor components and results, even simulated in advance, to plan in detail the start-up of a new asset, product or line.

Complex AI systems cope with these manifold requirements by the idea of 'AI on Demand': AI components ('building blocks') for sensing, understanding, and acting work together in complex systems. Here are some examples of AI technologies for Industry 4.0 characteristics:

- Machine Learning for Predictive Maintenance
- Ontology Merging for Plug & Produce
- GPU-based Anytime AI Planning Algorithms for Real-time Line Balancing
- Deep Learning, and Active Sensor Fusion for Online Quality Control
- Semantic Product Memories and further Semantic AI Technologies for the Digital Twin
- Plan Recognition, and User Modelling, AR/MR/DR for Worker Assistance
- Deep Learning for Process Anomaly Detection
- Multiagent Planning, BDI (belief–desire–intention) Architectures for Hybrid Teams In this context, the DFKI research department 'Cognitive Assistants' present a system for planning and optimizing
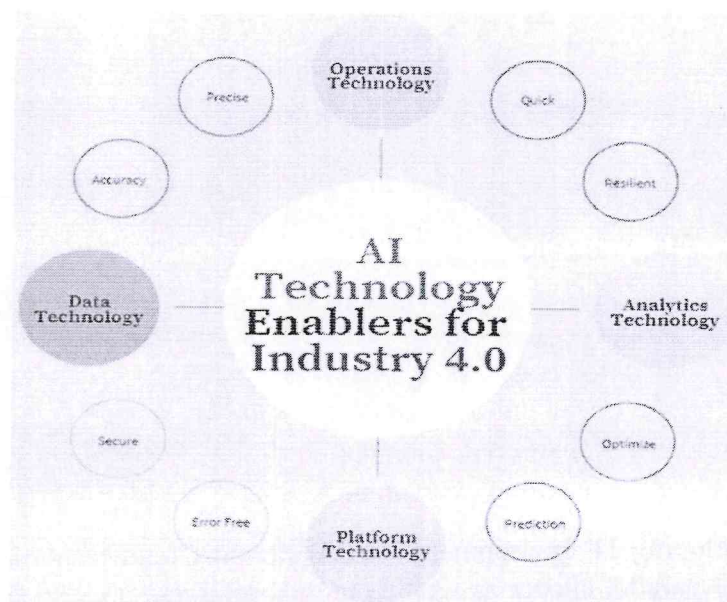
Ba Sys 4.0

The joint German reference research project, BaSys 4.0 aims at building a software infrastructure for Industry 4.0, which also supports production-relevant change processes. Main building blocks are the so-called Asset administration shell (Digital Twin), Structured (semantic) domain models, and a Service-oriented production concept. BaSys 4.0 provides an open source reference implementation. Its service-oriented production approach covers three layers: The orchestrated production process specifies the required resource capabilities, the asset administration shell of device provides uniform service interface for access to capabilities, while Powerline Communication (PLC) functions realize the pure skills (not the production logic). All services participate in the same distributed service platform via communication APIs and a uniform service structure.

Challenges

The foundation of artificial intelligence is an algorithm, a science, and technology that most people are familiar with. not aware of it. There are very few people working on building

AIbased technologies. Both an algorithm and a use. This is because implementing AI calls for new technological metrics. System based on. Researchers' ability to develop their data science and analytics skills should be improved use of the AI domain.

The need for the implementation of AI-based systems in industries has led to the business units' hiring of qualified analytics and data scientists for their various business needs and advancement. Business units practice their expertise to make greater use of AI-based systems. Given that an AI-based system needs pricey primarily for processing computing powers on hardware, such as graphics processing units (GPU), General business divisions cannot use their current funding to implement FPGS and the machine learning paradigm resources. Despite the increasing adaptability of using AI in business units, it is not integrated as quickly as was anticipated. websites that are planned to join a chain of businesses. Additionally, the companies that already the AI-based system, although it is still not fully utilizing its functional properties under models for machine learning. After decades of debate about the benefits and drawbacks of implementing AI-based systems for Investors are very skeptical about investing in company units because of the black box problem and humanity.

The use of AI-based technologies can be controlled by machines and algorithms, which improves the decision-making and Handling Black Box tools requires a progressive improvement in problem-solving skills. The automated system is to blame evaluation challenges while identifying errors and malfunctions during functional operation. Moreover, because because there aren't enough people to study and comprehend how these tools work, the industry Units have little to no control over such deployment, which can lead to complex market strategy.

The AI also has a set of limitations that prevent it from addressing all complex business logics. However, the AI field might offer well-known employment descriptions for sectors across the globe. That was done The AI community includes scientists and engineers with a variety of specialties and objectives. goals and preferences. However, the study of human intelligence is given the most attention in order to solve creating and implementing techniques for machines that can replicate the meticulous human process. The practical AI's machine learning and decision-making technique is built on analyzing categorized datasets that are private and frequently delicate in character.

When this happens, it might be challenging for people to understand. people. As a result, delicate problems like identity theft and data breach could occur. The majority of government Organizations and businesses that are vying for control and financial gain take advantage of AI-based systems that are globally interconnected. Algorithms are used to process data in AIbased systems. The precision Simply on the basis of how the system is trained, measures of decision-making AI systems are evaluated. utilizing objective and reliable data Consequences that are unfair and unethical might create problems for crucial making decisions. When solving problems, AI-based systems that were biased during training can introduce bias.

The effectiveness of employed AI systems and technologies directly affects their capabilities and power.

2. Conclusion

Industry 4.0 is one of the many fields in which the influence of Artificial Intelligence technology can be felt. In order to continue to improve and make industrial processes more efficient, the advancement of technology in general and AI in particular can be a great ally. AI technologies are a key success factor for Industry 4.0. Semantic technologies guarantee interoperability in multi-vendor factories and are the basis for a disruptive SOA production logic. GPU-based automated production planning in real-time is a breakthrough for flexible

automation. User Modeling, Plan Recognition as well as Intelligent Multimodal Interfaces are the basis for a new generation of worker assistance systems. Hybrid teams of cobots, softbots and people are a challenge for basic research in multi-agent coordination, e.g. with an acceptable solution of the transfer of control problem. Industry 4.0 brings many AI subfields together in one of the most important fields of industrialized countries like Germany. But the base line is that there is no Industry 4.0 without digitalization.

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Capital Structure Determinants: A Case Study of Pharmaceutical Industry

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ARTICLE INFO	ABSTRACT
	According to financial experts and authorities, the mix of funds in the capital structure varies, but the financial structure remains the same, therefore the capital structure represents both long-term and short term money sources. This study is focused on Pharmaceutical Industry and five companies are taken as sample based on market capitalization. The reference period of the study is five years (2020-24) and is completely based on secondary data which has been collected through various sources. In order to achieve the objectives of the study, the researchers have employed Correlation and Regression analysis. The findings of the study have put forth that capital structure do have statistically significant impact on the debt equity ratio (DE), value of the firm (VF), WACC, Return on invested capital (ROI), Earnings per share (EPS).
	Keywords: Capital structure, debt equity ratio, WACC, Pharmaceutical industry.

Introduction

The capital structure of a company refers to the composition of its financing, consisting of debt and equity (Myers, 2001). Companies can raise funds through equity, which involves selling shares of ownership, or through debt, which involves borrowing money. Maintaining an appropriate balance between debt and equity is crucial for achieving an optimal capital structure that enhances the performance of the organization and maximizes profits. Evaluating the capital structure involves assessing the ratio of equity capital to debt capital in a business to determine the most favorable combination of both. The traditional capital structure typically comprises two components: debt and equity. Debt can encompass various forms such as long-term loans, short-term loans, and other forms of borrowed funds, while equity includes share capital, common shares, and preference shares. In recent discussions, some experts argue that preference shares could be classified as part of debt due to their fixed rate of return.

A capital structure choice is a strategic management decision that affects the revenue and profitability of the firm's shareholders. Capital structure is a kind of long-term financial capital that determines how to invest best in fixed assets as well as guarantee profitability via a mix of loan and equity. Instead of deducting interest and the tax advantage from net income, some companies just deduct interest and the tax benefit. On the other hand, shareholders have a residual claim with the company's assets, while debt holders have a superior claim with the company's assets. A company's profits per share may be increased by incorporating borrowed capital into its capital structure [Rajesh et al 2019]. The financial strategy known as capital structure includes borrowing money in order to maximize profits. In terms of investment, Leverage refers to debt, sometimes known as borrowed money to fund Asset acquisition. A company's Assets may be financed or purchased using either debt or equity. Leverage is the most contentious issue in finance, and it is the one that academics are still under debating. Using Financial Leverage to fund Assets is referred to as Capital Structure. Because Capital Structure has a substantial effect on the owner's market return, and has consequences with the trading value of the shares. It is clear that the capital structure is the vital decision of the Management In specific terms, not only the Management does the business influence funding decisions, but the funding decisions also influence Management because the incorrect mix of money is used, the performance and survival of the commercial organization may suffer significantly. Nevertheless, businesses involved in financing decisions may be concerned with a wide variety of policies outside the direct authority of the firm's

Management. The company chooses an acceptable amount of Leverage to guarantee the business's viability [Phillip 2021].

Moreover, arguments revealed how successful businesses would likely draw in more shareholders than unprofitable ones, since they provide a guarantee of profit and security. Businesses face reduced financial difficulty and liquidation as a result of their increased debt payment capacity. This increases their reputation and availability in the stock sector and reduces their financing costs. High-profitability corporations may reconfigure their financial performance by increasing or decreasing the earnings per share. The study of [Sangeeta et al 2018] found that when all shareholders have complete information,. All trading expenses are zero, and there is no tax difference between capital gains and dividends, then the capital structure has no influence on shareholder's performance. But, the actual economies are beyond ideal. Numerous finance choice theories have been created throughout time to show the purpose of the capital mix and its involvement in business value. Leverage is often used to refer to the borrowing ratio, which expresses the connection between money borrowed and owner funds in a company's capital structure. It differs across companies and sectors. Businesses with equity are referred to as unlevered. The firm's funding decision is predicted with the current capital market conditions. There are no implications for restructuring the capital structure if the level of standards or banking sector theories does not consider an optimal capital structure for the company [Bhavana et al 2021].

Review of Literature

[Chaklader and Chawla 2016] investigated the drivers of capital structure for companies listed on the NSE CNX 500 from 2008 to 2015. According to the regression equation results, the independent variables describe 73.74 percent of the changes in capital structure. In their study, found that the capital structure directly relates to the size of the firm and its tangibility. However, the non-debt tax shield and liquidity have an insignificant relationship with capital structure. Another research used regression and correlation analysis to investigate the connection between the variables influencing leverage in listed manufacturing firms in Sri Lanka.

[Ghose and Kabra 2018] used an empirical survey of listed companies from 2004−2005 to 2015−2016 to investigate the significance of Capital structure in Indian enterprises. The research discovered that 32% of Indian companies chose their own Leverage. The study finds a positive effect of Tangibility, Productivity, and Industry median leverage on the Capital structure and a negative impact of profitability Ni distinctiveness on the Leverage. These findings are consistent with theoretical predictions and previous empirical findings[Madad et al 2015]. Every company is confronted with risks and uncertainties; the larger the firm, the stronger it is anticipated to be in such hazardous in uncertain circumstances. A larger company develops stronger methods and techniques of combating market risk and uncertainty. A larger company is anticipated to have a greater chance of offsetting unpredictable losses.

During the period of 2004−2013, the capital structure and Leverage has impact on firm value of a 422 Indian manufacturing firms. During 2004−2013, the total equity increased significantly, accounting for a larger proportion of total capital than debt. The panel data fixed effect regression method is applied to four distinct models, and it was discovered that there is no direct correlation between company value and leverage. In other words, in the Indian manufacturing sector, leverage has little effect on firm value [Chadha & Sharma 2017].

Several factors influence a company's decision regarding its capital structure, including the company's industry, growth prospects, profitability, and risk tolerance. Additionally, different theories have been developed to explain the determinants of capital structure choices. The trade-off theory suggests that companies aim to strike a balance between the tax advantages of debt financing and the costs associated with debt, such as bankruptcy and agency costs [Myers, 2001]. On the other hand, the pecking order theory proposes that companies prioritize internal financing sources, such as retained earnings, over external financing options like debt or equity issuance [Myers & Majluf, 1984]. Overall, the choice between debt and equity financing is a critical decision for companies, as it affects their financial structure, risk profile, and long-term sustainability. By considering the advantages and disadvantages of debt financing, companies can assess their specific needs, risk appetite, and growth objectives to determine the optimal capital structure that aligns with their overall financial strategy [Ali, 2022; Audi and Ali, 2019].

Furthermore, equity investors bear the risk associated with the company's performance and value, as their returns are contingent upon the company's success. One of the key advantages of equity financing is that it does not create additional financial obligations or interest payments for the company. Unlike debt, equity does not impose a fixed repayment schedule or interest burden, offering greater flexibility in managing cash flows and reducing the risk of default. Equity financing also brings strategic benefits, as it can attract investors who provide not only capital but also expertise, industry connections, and valuable guidance to support the company's growth [Cumming, 2018]. However, dilution of ownership is a potential drawback of equity financing. When new equity is issued, existing shareholders' ownership stake may be diluted, resulting in a reduced percentage of control and potentially diminished decision-making power. Therefore, companies must carefully consider the trade-offs between raising capital through equity financing and maintaining the desired level of ownership and control [Brigham & Ehrhardt, 2016].

Debt-equity ratio

The Debt-to-Equity ratio (D/E) indicates the proportion of the company's assets that are being financed through debt. It is a long term solvency ratio that indicates the soundness of long-term financial policies of the company. If the ratio is increasing, the company is being financed by creditors rather than from its own financial sources which may be a dangerous trend. Lenders and investors usually prefer low debt-to-equity ratios because their interests are better protected in the event of a business decline. A high debt/equity ratio generally means that a company has been aggressive in financing its growth with debt. This can result in volatile earnings as a result of the additional interest expense. Figure 1 represents the debt- equity ratios of various pharmaceutical companies in India from 2010 to 2024.

Source: Macrotrends.net
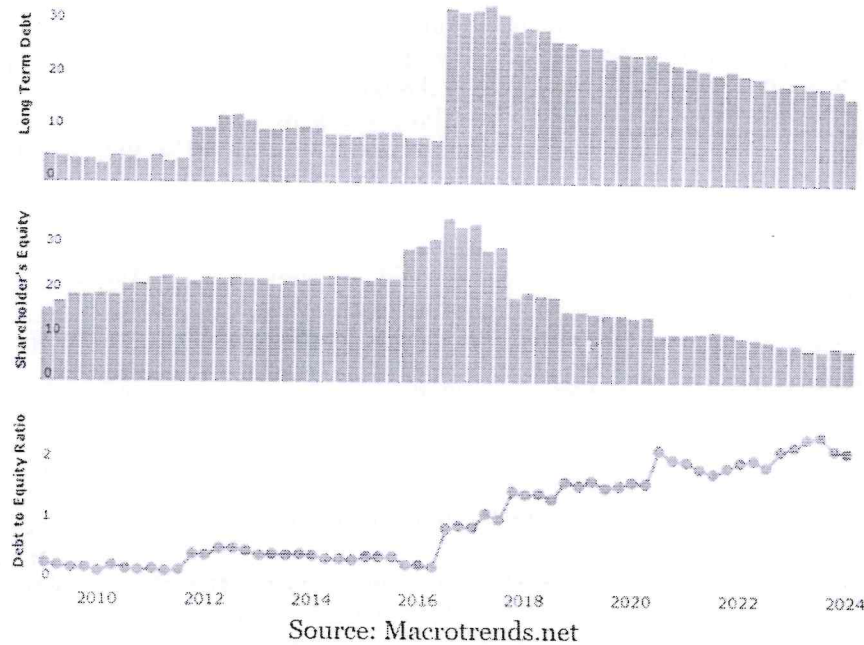
Objectives of the study

1. To understand the capital structure adopted by the selected pharmaceutical companies
2. To analyze the impact of capital structure on financial performance of selected pharmaceutical companies

Research Methodology

The study is mainly based on secondary data from 2020- 2024 i.e. Data gathered from the financial statements published by Companies. Based on the market capitalization, top five Pharmaceutical companies (Sun Pharma, Cipla, Divis Labs, Zydus Life and Dr. Reddy's Labs) listed in NSE. Correlation and Regression analysis was used to analyze the effect of capital structure of selected Indian pharmaceutical companies in India.

Hypothesis
H_1: There is positive relation between value of firm & debt-equity ratio
H_2: There is positive relation between debt-equity ratio and WACC.

Limitations of the Study

This research study concentrate only five pharmaceutical companies in India, hence the findings of this study may not be true for the whole industry.

Data Analysis and Interpretation
1. Sun Pharmaceutical Industries Ltd

Variables	Mar '24	Mar '23	Mar '22	Mar '21	Mar '20
Debt Equity Ratio	0.467	0.123	0.194	0.832	0.167
Value Of Firm	399,514.79	243,046.57	223,821.71	149,635.45	89,593.53
Degree of Financial Leverage	1.059326	1.04299	1.045134	1.0206	1.05654
Financial Leverage Ratio	65.05067	55.9696	46.7707	40.0253	35.9691
WACC	1.037001	0.27735	1.459842	0.34443	0.06344
Return on Invested Capital	64.82%	77.47%	53.02%	69.81%	26.43%
EPS	14.40%	15.17%	21.92%	18.895	29.03%

Table 1: Own calculation

With the help of data we were able to calculate debt equity ratio, value of firm, WACC, DOF and so on. Looking at the table 1 given above we can see the various changes done by the sun pharm company, and the effect it had on the numbers. Lower the WACC the better for company and for sun pharma the lowest WACC was in the year March 2023 when it was just 0.27%. During which even their ROI was highest among five years. The WACC was the highest in the year March 2022 at 1.45% The ROI was the lowest in the year March 2020 at 26.43%.

2. Cipla Ltd

Variables	Mar '24	Mar '23	Mar '22	Mar '21	Mar '20
Debt Equity Ratio	0.11	1.23	1.22	0.76	0.98
Value Of Firm	120,337.37	71,729.50	80,744.55	64,871.04	33,587.37
Degree of Financial Leverage	3.9657	1.80068	1.3699	1.23562	1.187
Financial Leverage Ratio	25.9728	22.4625	25.795	36.1137	34.606
WACC	2.0388	1.2154	0.9623	1.97762	2.0213
Return on Invested Capital	34.81%	12.50%	11.27%	15.44%	27.55%
EPS	50.46	31.12	36.63	30.57	28.72

Table 2: Own calculation

With the help of data we were able to calculate debt equity ratio, value of firm, WACC, DOF and so on. Looking at the table 2 give above we can see the various changes done by the company, and the effect it had on the numbers. Lower the WACC the better for company and for Cipla the lowest WACC was in the year Mar 22 at 0.96% and it was the highest in the year March 24 at 2.03%. During year Mar 24 their ROI was highest among five years at 34.81%.

3. Divis Laboratories Ltd.

Variables	Mar '24	Mar '23	Mar '22	Mar '21	Mar '20
Debt Equity Ratio	0.01	0.03	1.89	1.02	0.72
Value Of Firm	87,112.88	70,821.97	114,096.52	94,218.02	52,685.78
Degree of Financial Leverage	1.15	1.43	1.03	1.28	1.33
Financial Leverage Ratio	94.57	90.66	91.27	42.38	32.71
WACC	2.31%	4.31%	56.69%	6.70%	4.69%

Table 3: Own calculation

With the help of data we were able to calculate debt equity ratio, value of firm, WACC, DOF and so on. Looking at the table 3 give above we can see the various changes done by the company, and the effect it had on the numbers. Lower the WACC the better for company. Divis Lab had the lowest WACC in the year Mar 24 at 2.31%. During year Mar 22, their ROI (76.38%) was highest among five years.

4. Zydus life sciences Ltd

Variables	Mar '24	Mar '23	Mar '22	Mar '21	Mar '20
Debt Equity Ratio	0.76	0.75	0.56	0.73	1.12
Value Of Firm	33669.3	33380.2	30613.9	34627.3	31405.06
Degree of Financial Leverage	0.30388	8.93323	1.908719	1.629951	1.440443
Financial Leverage Ratio	29.95726	25.92996	21.61775	36.23554	52.49603
WACC	11.18%	5.32%	14.49%	12.53%	3.56%
Return on Invested Capital	12.21%	12.02%	17.67%	10.86%	11.03%
EPS	34.04%	15.29%	8.29%	14.75%	13.83%

Table 4: Own calculation

With the help of data we were able to calculate debt equity ratio, value of firm, WACC, DOF and so on. Looking at the table 4 give above we can see the various changes done by the company, and the effect it had on the numbers. Lower the WACC the better for company, and in case of Zydus Life sciences, the lowest WACC was in the year Mar 20. During the year Mar 22 their ROI was highest among five years at 17.67%.

5. Dr. Reddy's Laboratories Ltd

Variables	Mar '24	Mar '23	Mar '22	Mar '21	Mar '20
Debt Equity Ratio	0.10	0.19	0.09	0.06	0.09
Value Of Firm	102,161.00	76,348.99	71,782.46	74,673.98	52,829.90
Degree of Financial Leverage	1.0423195	1.048065	1.063462	1.025725	1.007852
Financial Leverage Ratio	141.16291	122.6186	104.8561	92.36747	78.54775
WACC	8.11%	4.53%	3.38%	9.38%	6.36%
Return on Invested Capital	202.13%	107.69%	195.63%	328.59%	236.94%
EPS	260.95%	157.37%	97.85%	131.84 %	177.23%

Table 5: Own calculation

With the help of data we were able to calculate debt equity ratio, value of firm, WACC, DOF and so on. Looking at the table 5 give above we can see the various changes done by the company, and the effect it had on the numbers. Lower the WACC the better for company, and in case of Dr. Reddys Lab, the lowest WACC was in the year Mar 22 at 3.38% and highest in the year March 2021 at 9.38%. During year Mar 11 their ROI was highest among five years at 328.59% and lowest in the year March 2013 at 107.69%

Correlation Analysis

Variables	DE	VF	WACC	ROI	EPS
DE	1.000				
VF	0.812	1.000			
WACC	0.429	0.269	1.000		
ROI	0.102	0.234	0.872	1.000	
EPS	0.284	0.359	0.454	0.0921	1.000

Table 6: Own calculation

The above table 6 explains about the co-relation between the debt equity ratio (DE), value of the firm (VF), WACC, Return on invested capital (ROI) and Earnings per share (EPS). There is a positive correlation of 0.812 between debt equity ratio and value of the firm. There is a strong and positive co-relation of 0.429 between debt equity ratio and WACC. A positive co-relation of 0.102 was found between debt equity ratio and Return on invested capital and followed by debt equity ratio and Earnings per share having positive 0.284 correlations between the variables. Hence it's proved that there is positive relation between value of firm & debt-equity ratio and WACC.

Regression Analysis

Variables	Multiple R	R Square	Adjusted R Square	Standard Error	F Value
DE	0.219	0.09	.503	0.05523	0.01
VF	0.221	0.22	.922	0.19339	0.00
WACC	0.103	0.29	.150	0.09912	0.00
ROI	0.323	0.92	.210	0.08845	0.00
EPS	0.029	0.53	.329	0.03882	0.00

Table 7: Own calculation

The regression table 7 shows the fitness of the model. The significance values are less than 0.05. Hence, the null hypothesis is rejected. The Standard error between value of firm & debt equity ratio is very low this shows the high precision in the relation which can be accounted on the factors like sample size, profitability etc. Study concluded that the variables i.e., debt equity ratio (DE), value of the firm (VF), WACC, Return on invested capital (ROI), Earnings per share (EPS) are significantly influence on the capital determinates in pharmaceutical industry.

Conclusion

Deciding capital structure is critical for all business organizations. In today's competitive era, such decisions have a significant role in augmenting returns of firms. The present study appraises the association between

the capital structures of selected pharmaceutical companies in India. Having seen the results and the relationships existing between the variables on the regression table, this made conclusions based on the outlined objectives viz-a-viz the hypotheses formulated to test the said objectives. The analysis shows that the P value (0.00) which shows the significant relationship debt equity ratio (DE), value of the firm (VF), WACC, Return on invested capital (ROI), Earnings per share (EPS) are significantly influence on the capital determinates in pharmaceutical industry. From the above detailed analysis and limited number of companies taken into consideration, there is nostrong relation found between any determinants of capital structure. This analysis is limited to the companies studied by us and there is a possibility of other determinants which might have a strong relation with the ones studied.

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Big Data Analytics in Support of the Decision Making Process in IT Sector

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Abstract

The advent of big data analytics has revolutionized the decision-making process across various industries, particularly in the IT sector. This research paper explores the integration of big data analytics into the decision-making within IT organizations. It highlights how the adoption of big data tools and methodologies enhances the efficiency, accuracy, and strategic capabilities of IT decision-makers. This paper is an attempt to conduct a full-scale review on big data researches and its effects on the decision-making affair in an industry. Furthermore, decision makers need to be able to gain valuable insights from such varied and rapidly changing data, ranging from daily transactions to customer interactions and social network data. Such value can be provided using big data analytics, which is the application of advanced analytics techniques on big data. The study adopted a survey instrument and collected data from 230 respondents engaged in big data analytics in the IT sector of India. The research study identified that a positive and significant relationship exists between big data analytics and the decision making in IT sector.

Keywords: Big data analytics, IT sector, Decision making, Technology

Introduction

The modern era of digital technology evolution has changed the way how organizations operate on a daily basis based on the business-driven approach. The extensive amount of data is easily available since the storage type has increased with the data collection. With each second passing by more and more data is being generated from several sources (Nutt, Paul C.et al 2012) Such data is required to have some mechanisms such that it can be stored for analysis to draw the value. Organizations should push for capturing the maximum value out of the huge data repository (Hurwitz, Judith, et al 2013). In addition to that, organizations and corresponding stakeholders hold the technology and devices allowing them to create and store data based on different grouping or buckets. Each user these days can have access to personal devices i.e. laptops, smartphones, and such devices consist of larger data volumes which can be important to the organizations. Such type of data is referred to big data where data varies based on volume, variety, and velocity which becomes difficult to maintain and manage with the existing set of tools (Russom et al 2019).

The rapid proliferation of data in recent years has given rise to the field of big data analytics, which involves the examination of large and varied data sets to uncover hidden patterns, correlations, and insights. In the IT sector, decision-making processes have become increasingly complex due to the dynamic nature of technology and market demands. Big data analytics provides IT leaders with the ability to make data-driven decisions that can lead to improved efficiency, innovation, and competitive advantage.

In the era of digital transformation, organizations realize the value and importance of making the right decisions at the right time, which can only be made through relying on the relevant and timely availability of data and information that are processed as part of the decision-making process (Joseph & Gaba, 2020). At any level of an organization, the decision-making process is supported through information that can be processed in a meaningful manner. The sequence of collecting,

A Study On Financial Analysis Of Selected Public Sector Banks Using Camels Ratios

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Abstract

Commercial Banks serve as backbone to the Indian financial sector, which facilitate the proper utilization of financial resources of an economy. The Indian banking sector is increasingly growing and it has witnessed a huge flow of investment. In order to cope with the complexity and a mix of risk exposure to banking system properly, responsibly, beneficially and sustainably, it is of great importance to evaluate the overall performance of commercial banks by implementing a regulatory banking supervision framework. One of such measures of supervisory information is the CAMEL rating system which was put into effect. The research paper is an attempt in the assessment of financial analysis of Public Sector Banks for the financial years March 2009 to March 2019. The financial performance and position is an efficient measure and indicator to judge the strength of financial system of an economy. The CAMELS ratings or Camels rating is a supervisory rating system originally developed in the 1Source-RBI U.S. to classify a bank's overall condition. It's applied to every bank and credit union in the U.S. (approximately 8,000 institutions) and is also implemented outside the U.S. by various banking supervisory regulators. The ratings are assigned based on a ratio analysis of the financial statements, combined with on-site examinations made by a designated supervisory regulator.

Introduction

The Indian banking sector's performance is professed as the replica of economic activities performed in an economy. Sound financial health of a Public sector banks provides the assurance not only to its depositors but is equally significant for its stakeholders and economy as a whole. The Public Sector banks penetrate every corner of the Indian economy and have been extending and expanding the business to contribute the growth of the economy and GDP. Public Sector Banks and Private Sector Banks have had the distinction of being recognized as banking institutions, which provides satisfying services to its customers or account holders. During the last two decades the Private Sector Banks emerged in Indian economy and started services by capturing a market share of Public Sector Banks. To grab the customers, they have come up with various offers like more interest on deposits, Penetration in loan and advances offers, online banking, door step services, Core-banking and many more these kind of services rendered has created hindrance and competition to public sector banks.

Therefore, efforts have been made by researcher to compare the strength and performance of the Public Sector Banks. In view of these it is necessary to know how the public sector banks are performing of Financial Analysis. CAMEL Rating Model is used to compare the performance and efficiency of Public Sector banks.

Literature Review:

Research has been undergone by research scholars in India and in other countries so as to derive solutions for various banking problems and prospects in CAMELS RATING MODEL in public sector banks.

Mr. Parveen Chauhan (2019) discussed foreign banks performance of 10 European countries which involved 319 banks and found that entry of foreign banks adversely affects the revenues of domestic banks from point of view of both non-interest income and interest income from assets and profitability. Overhead cost and the competition with domestic banks also gets increased with their entry in the short run.

Mr.Nandan Velenkar, Ms. Surbhi Pahuja (2019) studied the cause and effect relationship was checked by regression model using E-views and the result of the study revealed that cost of human capital has a significant impact on financial performance of the private sector banks of India.

Mr. Parveen Chauhan (2019) studied in the first Stage, efficiency, banking structural and concentration shift has been measured, second stage tried to find out the determinants of banking efficiency and concentration (bank level and country level).

Mr. Pushkala Narasimhan and K.A Venkatesh (2019) studied the last ten years' good number of articles appeared based on Data Envelopment Analysis to study the efficiencies of various industrial sectors. In this paper, we have deployed the two-stage DEA to study the efficiencies of the public and private sector banks in the context of OBS.

Dr. Arasu Raja, (2019), studied the technological era demands continuous learning of the workforce irrespective of the industries they work. It even applicable to the public sector enterprises which need to compete with its counterpart in private sector. The e-learning systems are emerging technology in India which facilitates continuous learning through internet and electronic networks. The main aim of the study is to examine the impact of quality of e-learning systems on organizational performance of the selected public sectors banks at Chennai city.

Mr.Parvesh Kumar Aspal1, Mr. Sanjeev Dhawan2, Mr. Afroze Nazneen (2019), studied - A sound financial system has vital influence on the economic development of a country. Banking system constitutes an important component of the financial system of the country; therefore, the economic importance of banks may not be underestimated. Performance evaluation of the banking system is an effective measure and indicator to check the strength of financial system of an economy. The overall objective of the present study was to explore the influence of bank specific factors and macroeconomic factors on the performance of private sector banks in India. To examine the effect of external or macroeconomic factors, growth rate of gross domestic product [GDP] and average annual inflation rate were considered.

Mr. Nandan Velenkar, Ms. Surbhi Pahuja (2019) studied the cause and effect relationship was checked by regression model using E-views and the result of the study revealed that cost of human capital has a significant impact on financial performance of the private sector banks of India.

Objectives:
1.	To evaluate the overall financial performance and position of the public sector banks and private sector banks with reference to CAMELS rating Model.
2.	To evaluate the financial rating procedure followed by the public sector and private sector banks through CAMELS rating model.

Analysis and Interpretations:
ANOVA Analysis for PSB's from 2010-2019 Table 4.17: CAMELS Ratios of Public Sector Bank's from 2010-2019

Hypothesis-1
H0: The CAMELS rating model shall not facilitate in the evaluation of financial   performance and position of both public and private sector banks in India.

H1: The CAMELS rating model shall facilitate in evaluating the financial performance and position of both public and private sector banks in India.

Name of the Bank	CAR	Assets	Management	Earnings	Liquidity	Sensitivity
State Bank of India	138.45	20.50	126788796.2	110.12	11.76	6.03
Canara Bank	125.27	21.23	811227662.1	100.74	23.39	5.98
PNB	129.03	18.96	123664502.9	37.73	24.15	6.43
BOB	123.90	18.53	178468320.5	85.58	20.89	5.70
CBI	126.74	14.66	106753433.8	11.60	24.44	7.51
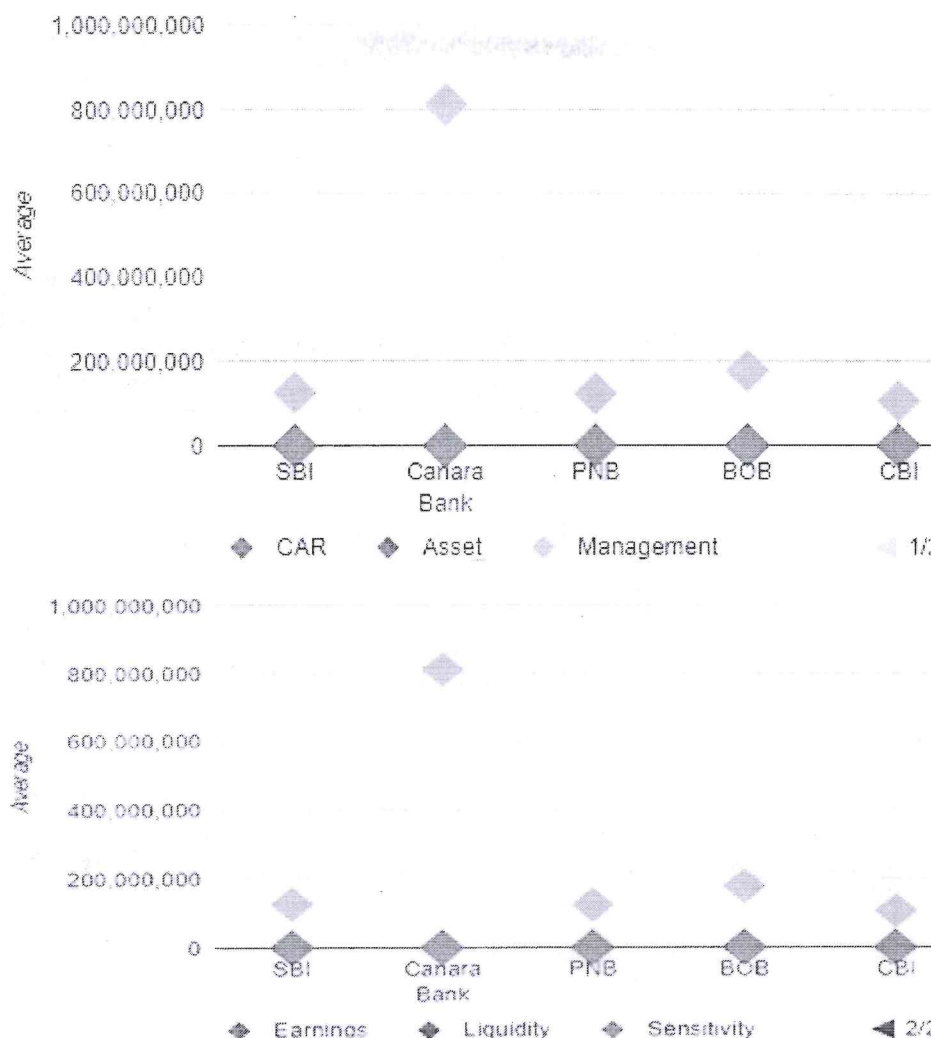
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Source	DF	Sum of Squares (SS)	Mean Squares (MS)	F statistics (df1, df2)	P-Value
Factor A - rows (A)	4	61646088060000000	15411522020000000	1 (4,20)	0.4307
Factor B - columns (B)	5	302357711300000000	60471542270000000	3.9238 (5,20)	0.01216
Error	20	308230391900000000	15411519590000000		
Total	29	672234191300000000	23180489350000000		

Factor - A

1.H0 hypothesis

Since the p-value > α, H0 cannot be rejected. The averages of all groups assume to be equal.

In other words, the difference between the averages of all groups is not big enough to be statistically significant. A non-significance result cannot prove that H0 is correct, only that the null assumption cannot be rejected.

2. P-value

The p-value equals 0.4307, ($P(x \leq 1) = 0.5693$). It means that the chance of type I error, rejecting a correct H0, is too high: 0.4307 (43.07%). The larger the p-value the more it supports H0.

3. Test statistic

The test statistic FA equals 1, which is in the 95% region of acceptance: $[-\infty : 2.8661]$.

4. Effect size

The observed effect size $\eta 2$ is large, 0.17. This indicates that the magnitude of the difference between the averages is large.

Factor - B

1. H0 hypothesis

Since the p-value < α, H0 is rejected.

Some of the groups' averages consider to be not equal.

In other words, the difference between the averages of some groups is big enough to be statistically significant.

2. P-value

The p-value equals 0.01216, ($P(x \leq 3.9238) = 0.9878$). It means that the chance of type I error (rejecting a correct H0) is small: 0.01216 (1.22%). The smaller the p-value the more it supports H1.

3. Test statistic

The test statistic FA equals 3.9238, which is not in the 95% region of acceptance: $[-\infty : 2.7109]$.

4. Effect size

The observed effect size $\eta 2$ is large, 0.5. This indicates that the magnitude of the difference between the averages is large.

From the above results, the P-value is equal to 0.430. It means rejecting the null hypothesis i.e CAMELS rating model will help in measuring the public sector banks performance and position.

Chart 4.1: CAMELS ratio of PSB's from 2010-2019

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A Study On Consumer Purchase Intention Towards Functional Dairy Products In Bengaluru North

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ABSTRACT

Functional dairy products are healthy products of the future including probiotics, energy-boosting foods and those enriched with vitamins and minerals. Dairy products such as yogurt and cheese containing probiotics and milk containing omega-3 fatty acids have a prominent position in the development of functional foods. Functional dairy products market is growing steadily. Functional products benefits and health claims are highlighted in the front of pack labelling and nutritional labelling. Consumer awareness and perception related to these products have an important role in consumers' acceptance and subsequently long-term marketplace success of these products. The purpose of this paper is to know if the consumers prefer functional dairy products. The decision of whether the product is functional depends on nutritional labelling also. The findings were that almost all participants were unfamiliar with the term "functional dairy products," and few had consumed these products. Functional dairy products were not found to be necessary for some participants. Quantitative research approach was adopted in this research project to test pre-determined hypotheses and to generalize the results. Functional products that are used in a given month included probiotic milk, yoghurt, organic milk. The frequency of purchase of functional dairy products is 2 times a week and low fat cheese is purchased only once a week. If the health claims on the front of pack labelling is good purchase of functional dairy products is high as found out from the study. The participants were of the opinion that information provided from a trusted and credible source such as health professionals or authorities through different communication channels like television, training classes, shopping centre would create awareness about functional dairy products. There was a significant association between health consciousness and usage of functional dairy products. Consumers who care about their health give special importance to usage of functional dairy products. The results indicated that "Nutrition Label" had significant effects on "Reason to evaluate" and "Purchase Intention". In addition, "Reason to evaluate" also had a significant effect on "Purchase intention". Interestingly, female respondents and respondents with higher income had significant effects on "Reason to evaluate" which subsequently affected "Purchase intention". Data was analysed with the help of SPSS tools.

Keywords: *Consumers' Purchase Intentions, Functional dairy products, Product Knowledge, Health Consciousness, Gender, Reason to evaluate, Purchase intention, Nutritional labels.*

1. INTRODUCTION:

The dairy industry has been facing numerous challenges and opportunities due to changing consumers' preferences as well as due to environmental and ethical concerns. Dairy products an'd especially milk and curd have been traditionally regarded as healthy

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functional foods as such, they are also considered to contain numerous functional ingredients and materials that benefit human health such as energy, protein, calcium, probiotics etc. But the functional aspect of these foods are being further used by marketers by highlighting various health claims to market these products .Various health claims used on the nutritional labels of these products are "Rich in probiotics", "High in calcium" ,"Necessary for bone development", "Organic" etc. The primary objective of this research is to investigate consumers' purchase intentions towards functional dairy products. During the last decade, India has seen dramatic shift towards consumption of value-added and functional milk products such as cheese, yoghurt, ultra-heat treatment milk, flavoured milk, and whey. Most of the organized players in the dairy industry are expanding their product portfolios in the value-added and functional segment to take advantage of the changing consumer food preferences.

2. STATEMENT OF THE PROBLEM:

Functional foods have drawn a lot of scientific attention throughout the years, especially in regards to improving dietary health and technological advancements. Given the ongoing changes in consumer preferences as well as environmental and ethical concerns, the dairy industry today faces a variety of obstacles and opportunities. Historically, dairy products— especially fluid milk—have been recognised as nutritious foods. Additionally, they are thought to contain a wide range of useful components and substances that are good for human health, including calcium, energy, protein, carbohydrate, and cholesterol. Future healthy food products will include probiotics, foods that enhance energy, and those that are vitamin and mineral fortified. Functional foods are among them. Milk containing omega-3 fatty acids and dairy products like yoghurt and cheese that include probiotics have a significant role to play in the creation of functional meals.

3. REVIEW OF LITERATURE:

It may be argued that adding a nutritional panel to the package will increase consumer demand for food items and that it would be a wise strategic move for the area's food producers. (Prathiraja et al 2003)

Food labelling appeared to influence purchasing behaviour among non-Muslim customers in Malaysia, according to Abdul Latiff, Z.A. et al's (2013) research, MZ Hoque's (2018)findings demonstrated that buyers are more likely to purchase both ultra-high temperature treated fresh milk (UFM) and pasteurised fresh milk (PFM) products when given labelling information and sensory perceptions match. The link between product labels and customer purchase intentions can be mediated by sensory impressions in PFM, but not in UFM. His findings suggest that dietary information and personal health responsibility are the keys to the commercialization of fresh milk in terms of increasing relative weights and commonness.

Joshua Wesana and Xavier Gellynck et al(2020) pointed out that despite the substantial support for nutrition-sensitive value-chain techniques, data on consumer preferences for such treatments are sparse. By investigating a nutrition-sensitive chain labelling programme and utilising the Ugandan dairy industry as a case, this study seeks to close this gap. A poll of 250 customers was undertaken to learn more about their opinions on the significance of nutrition-sensitive chain labels in comparison to nutrition claims and facts. Additionally, a choice-based conjoint experiment with the qualities of price, brand, fat content, and nutrition label was created. Findings indicate that consumers had a higher favourable opinion of nutrition-sensitive chain labelling than nutrition claims or facts. According to ordered logistic regression analysis, consumers' perceptions of the significance of a nutrition-sensitive chain label in relation to sex, age, children, and milk purchase frequency were influenced by BMI, nutrition awareness, and label use..The greater utilities for the nutrition-sensitive chain label in the combined experiment provide as confirmation of this. The integration of nutrition-sensitive chain labelling with current labels in a way that encourages open interpretation by customers should be the main topic

of future study. These results can be used by industrial and policy actors in the agri-food industry to create and control suitable labelling programmes in the context of nutrition-sensitive value chains.

Tingyi Yang1 and Senarath Dharmasena2 (2020) highlighted that milk and other dairy products are especially important for ensuring the nutritional integrity of American households' diets. However, households in the United States are increasingly choosing dairy replacement beverages over regular milk due to issues with taste, nutrition, health, and the environment. This research is driven by the need to analyse changes in customers' purchasing behaviour and willingness to pay for conventional milk products and dairy substitute beverages while taking into account inherent qualities and variances of such characteristics. This study estimates both linear and semi-log hedonic pricing models after combining and organising Nielsen Homescan purchasing data with first-hand nutrition data. The findings demonstrate that consumers place the most value and weight on such qualitative characteristics as nutritional features, which include calories, protein, fat, vitamin A and vitamin D.Protein is the most valued component among calories, protein, fat, vitamin A, and vitamin D; other features include package size, multipack, and brand. The hedonic pricing order and value of these qualitative characteristics give producers with crucial information to further differentiate their products and create items that appeal to consumers' preferred traits. These qualitative characteristics are also predictive of consumers' purchasing behaviour.

Food safety concerns were becoming more widespread in most nations, having an impact on people's health, social stability, and economic growth. Consumers had long been concerned about the safety of dairy products. The purpose of this study was to examine consumer worries over dairy product label information and its contributing elements. The results showed that, overall, customer worry over dairy product label information was very high and that there were considerable disparities in consumers' levels of concern. According to regression analysis, customers' concerns regarding dairy product label information were substantially more influenced by education than by age. The government will be able to successfully educate the public about dairy products with the help of the study's findings as elaborated by Ce Xu,1Can Liu,1and Jingmin Cheng(2021)

While there is interest in organic food items, consumers who regularly purchase milk give special attention to physical factors such food safety, freshness, packaging, and flavour. They also take required information into account. This type of customer typically does not want to engage in learning more about items and is also highly interested in the "standard information" that producers are required to supply. The sole exception is "nutritional information," a disclosure type considered by a more informed and attentive consumer willing to make a small further investment in his information gathering. More emphasis is placed on specific information by consumers who care about environmental issues and animal welfare; this information is typically supplied freely by the manufacturer in an effort to improve his products.(Andrea Marchini et al 2021)

The most crucial details on the labels of dairy products to pay attention to were the date of manufacturing, shelf life, and storage conditions. This work has some political and regulatory importance, and national authorities should spend more on dairy education and communication to give consumers—including those from more diverse backgrounds—the information they need to make informed dairy shopping decisions. The public needed assistance in evaluating the state of food safety and making informed decisions, so it was imperative that the government strengthen its capacity to handle risks related to food safety. The study found that people had favourable opinions about dairy protein. This mindset persisted regardless of age, gender, or stage of life. There were misconceptions about the contents and health advantages of yoghurt. Yogurt's low-fat nutrition claims were seen

negatively, which made people choose full-fat dairy products. More analysis and investigation are needed for this. (Nuala Collins et al 2023)

4. OBJECTIVES:

To study the purchase intention towards functional dairy products
To map the characteristics of people who prefer functional dairy products
To offer suggestions in relation to the usage of functional dairy products

5. METHODOLOGY:

5.1. Data Collection

A total of 100 questionnaires were collected from respondents in Bengaluru North. Convenience sampling method was used to select the sample .Functional dairy products were chosen as the product because dairy products are one of the most commonly consumed food. The aspects of nutrition labels such as nutrient claims, health claims, and ingredients were included in this study. Data was analysed with the help of SPSS software

6. ANALYSIS OF DATA:

Respondents' characteristics:
- 60% Respondents were of the age group 40-60& 40% respondents were of the age group 20-40
- 60% Respondents were from Bengaluru as their native while 40% were from different places of North India
- 55% were men and 45% were women respondents
- Educational level of respondents was 40% were postgraduates 50% were undergraduates and 10% had completed their higher secondary(Table I)

TABLE 1.1: DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS

Age group	Nativity	Educational level	Gender
60%(40-60)	60%(From Bengaluru)	40% Postgraduates	55%(Men)
40%(20-40)	40%(From other places)	50% Undergraduates	45%(Women)
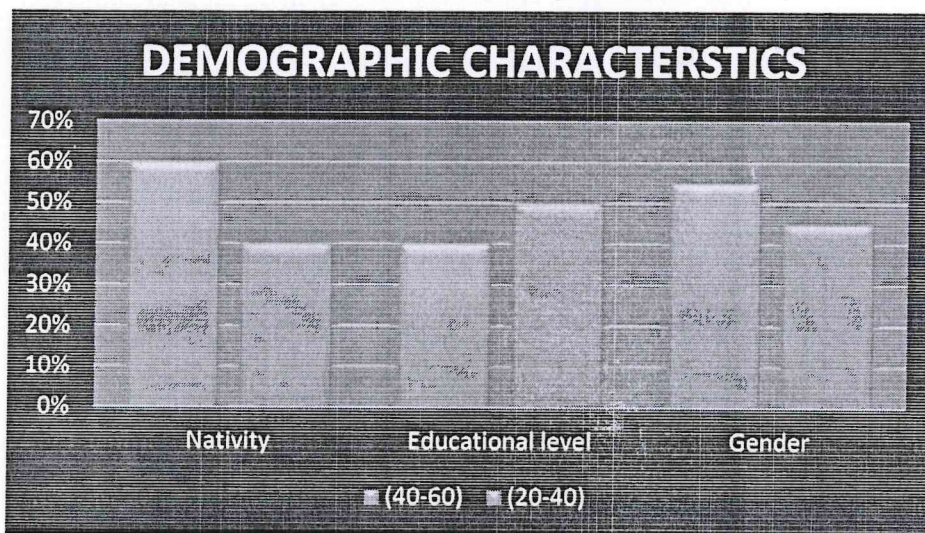
GRAPH1.1: DEMOGRAPHIC CHARACTERSTICS

TABLE1.2: LEVEL OF AWARENESS OF THE TERM "FUNCTIONAL DAIRY PRODUCT" AMONG THE SAMPLE.

Aware	Not aware

20%	80%
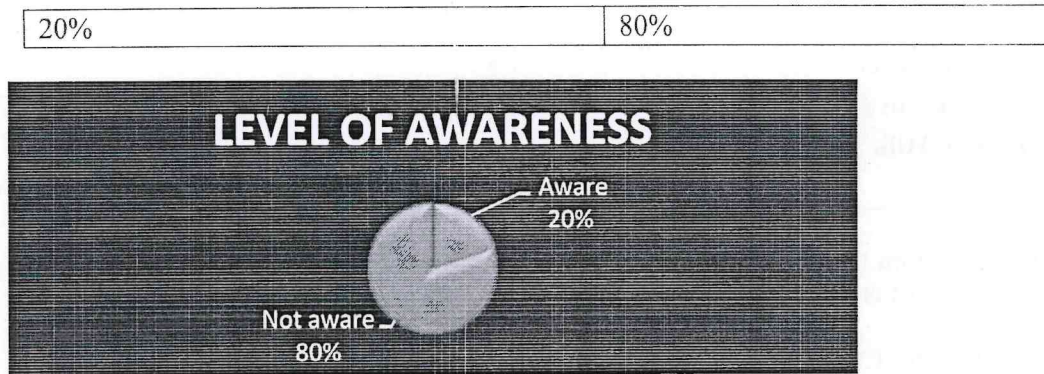
GRAPH 1.2: LEVEL OF AWARENESS

Finding: From the above graph it is evident that almost all participants were unfamiliar with the term "functional dairy products,"

TABLE 1.3: LEVEL OF NECESSITY

I need functional dairy products	I do not need functional dairy products
22%	78%

GRAPH1.3: LEVEL OF NECESSITY

Finding: Functional dairy products were not found to be necessary for some participants and they had less trust in health claims of these products for various reasons.

TABLE 1.4: AVERAGE USAGE OF FUNCTIONAL DAIRY PRODUCTS IN A GIVEN MONTH

Average usage of functional dairy products in a given month	
Men	7
Women	10
Average	8

Finding: The average usage of functional products is 8 .8 Functional products are used in a given month and that included probiotic milk, yoghurt, organic milk

TABLE 1.5: FREQUENCY OF PURCHASE OF FUNCTIONAL DAIRY PRODUCTS

Type of Functional Dairy Product	Frequency of Purchase in a week
Low fat butter	2

Low fat cheese	1
Organic butter	2
Probiotic curd	2
Organic Milk	2
	FREQUENCY=2

Finding: From the above table it is evident that the frequency of purchase of functional dairy products is 2 times a week and low-fat cheese is purchased only once a week

TABLE 1.6: CORRELATION BETWEEN HEALTH CLAIMS AND HABITUAL BUYING

Belief in health claims	No of respondents who buy habitually	Belief in Health Claims
I believe health claims and buy functional dairy products everyday	12	26
I do not buy functional dairy products everyday	88	74

Finding: So, the correlation coefficient between habitual buying and belief in health claims is 1. We can conclude that habitual buying is positively related to belief in health claims.If the health claims are good purchase of functional dairy products is high

TABLE 1.5: Analysis showing gender-based relationship between gender (male or female) and the preferred functional dairy product. The following table summarizes the results. The hypothesis was tested with a significance level of 10%.

		Functional Dairy Products			
		Organic milk	Probiotic curd	Organic butter	Total
Gender	Male	15	23	10	48
	Female	25	19	8	52
	Total	40	42	18	100

The hypotheses are:
Ho: Gender and preference towards functional dairy products are independent
H1: Gender and preference towards functional dairy products not independent

Expected counts table

		Organic milk	Probiotic curd	Organic butter	Total
Gender	Male	15 (19.2)	23 (20.16)	10 (8.64)	48
	Female	25 (20.8)	19 (21.84)	8 (9.36)	52
	Total	40	42	18	100

None of the expected counts in the table are less than 5. Therefore, we can proceed with the Chi-Square test.

The test statistic is:
$(15-19.2)219.2+(23-20.16)220.16+...+(8-9.36)29.36=2.95$
The p-value is found by $P(\chi^2 > \chi^{2*}) = P(\chi^2 > 2.95)$ with $(3-1)(2-1)=2$ degrees of freedom. Using SPSS, we find the p-value to be 0.2288.
A p-value of more than 10% indicates that there is no relationship between gender and preference for functional dairy products. But since the P value is less than 10% there is relationship between gender and preference for functional dairy products

TABLE 1.6: CORRELATION BETWEEN HEALTH CONSCIOUSNESS AND USAGE OF FUNCTIONAL DAIRY PRODUCTS.

Level of health consciousness	Health consciousness	Usage of functional dairy products
Health conscious consumers	30	25
Health indifferent consumers	70	75

Finding: There is a significant association between health consciousness and usage of functional dairy products. The correlation coefficient between Health consciousness and Usage of functional dairy products is 1.We can conclude that health consciousness is positively related to usage of functional dairy products,Consumers who care about their health give special importance to usage of functional dairy products

Hypothesis model:
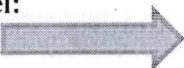
Nutritional label ⟹ Reason to evaluate ⟹ Purchase intention

TABLE 1.7: INTENSITY OF PURCHASE INTENTION

Factors and Attributes	Highly agree	Agree	Neither agree/ disagree	Disagree	Highly disagree
I have reason to evaluate like health consciousness, fitness needs so I read labels	40	30	20	10	10
When I have more reasons to evaluate my purchase intention also becomes stronger	60	20	10	5	5

Factors and Attributes	Mean	Standard Deviation
I have reason to evaluate like health consciousness, fitness needs so I read labels	3.6	1.23
When I have more reasons to evaluate my purchase intention also becomes stronger	4.1	1.46

INTERPRETATION:

Factor1:

Hypothesis 1: There is a positive relationship between health consciousness, fitness needs, and reading labels

Hypothesis 2: There is no relationship between health consciousness, fitness needs, and reading labels

The mean score for this factor is 3.6, which indicates that, on average, respondents somewhat agree with the statement. The standard deviation of 1.23 suggests that there is some variability in the responses, but overall, the majority of respondents lean towards agreement.

Health consciousness level	30	40	20	10	10
Reading labels	40	30	20	10	10

The coefficient of correlation is 0.852941 which indicates that there is a positive relationship between health consciousness, fitness needs, and reading labels

Factor 2:

Hypothesis 1: There is positive relationship between having more reasons to evaluate and the intensity of purchase intention

Hypothesis 2: There is no relationship between having more reasons to evaluate and the intensity of purchase intention

The mean score for this factor is 4.1, indicating that respondents tend to strongly agree with the statement. The standard deviation of 1.46 suggests that there is some variability in the responses, but the majority of respondents show a strong agreement with this factor.

Reasons to evaluate	50	15	15	7	3
Intensity of purchase intention	60	20	10	5	5

The coefficient of correlation is0.98409 which indicates that there is a positive relationship between having more reasons to evaluate and the intensity of purchase intention

Overall, the data suggests that respondents generally have positive attitudes towards the factors mentioned. They show a moderate to strong agreement with the statements related to health consciousness, affordability, and the influence of reasons on purchase intention.

Finding: The results indicated that "Nutrition Label" had significant effects on "Reason to evaluate" and "Purchase Intention". In addition, "Reason to evaluate" also had a significant effect on "Purchase intention".

7. FINDINGS:

Many participants were unfamiliar with the term "functional dairy products," as functional dairy products refer to healthy organic products and the concept is developing in India as a novel concept like probiotic milk, probiotic curd etc.Functional products are used in a given month and that included probiotic milk, yoghurt, organic milk etc.If the health claims are good purchase of functional dairy products is high.There was a positive relationship between gender and preference for functional dairy products.Female consumers were found to evaluate labels and purchase more functional dairy products.Health consciousness is positively related to usage of functional dairy products.There is a positive relationship between health consciousness, fitness needs, and reading labels. Higher the reason to evaluate higher the purchase intention.

8. DISCUSSION:

Area where raw milk can be improved to capitalise on market opportunities brought about by shifting global lifestyles is with functional milk. Liquid breakfasts, high-protein whey drinks, energy drinks, milk with cocoa fortified with protein, and vitamin-enriched milks are examples of functional milk but many consumers were not aware of the concept due to various reasons. Regardless of the non awareness functional products were still used like probiotic milk, almond milk etc. Health claims on packages like "Rich in fortified milk with calcium and vitamins" etc increased the purchase of functional dairy products because people who shop are easily attracted to such claims

Gender had a significant effect on the purchase of functional dairy products as women are more likely to think about family health and shop for products that enhance family health.A successful product launch and the development of marketing strategies for the novel functional foods industry depend on an understanding of the factors that influence consumer acceptance and their relationships, given the competitive nature of the market for functional foods and consumers' intricate acceptance process health consciousness played a major role in the acceptance of functional dairy products. Higher the reasons to evaluate labels lead to high purchase intention because consumers who have interest in reading labels read because of the intention to purchase and vice versa. Increasing the reasons to

evaluate through a good package design with good health claims will increase the purchase intention among the consumers

9. RECOMMENDATIONS:

Many participants were unfamiliar with the term "functional dairy products, "awareness can be created about the same and marketers can utilise this term in marketing dairy products to market healthy segment of dairy products and can venture into new avenues of introducing functional products like probiotic milk etc. New business models can be developed in manufacturing and marketing dairy products. Functional dairy products were not found to be necessary for some participants and they had less trust in health claims of these products for various reasons like lack of transparency, lack of faith in food standards and food certifying agencies

Functional products that were used included probiotic milk, yoghurt, organic milk, these avenues can be ventured into by dairy product industry.Habitual buying was found to be positively related to belief in health claims. If the health claims are good purchase of functional dairy products is good. For habitual buyers. Consumers who regularly buy functional products had belief in health claims on the labels of the products. Habitual buying segment can be identified to market functional dairy products.

Consumers who care about their health give special importance to usage of functional dairy products. This segment also can be identified to market functional dairy products. There was a positive relationship between health consciousness, fitness needs, and reading labels. If there were more reasons to evaluate the intensity of purchase intention was high as found from the study.Various reasons that increased purchase intention towards functional products was health consciousness, affordability, etc. Special advertisement campaigns targeting women consumers about the functional dairy products can be undertaken

Package colours signifying different components or categories of dairy products can be used like probiotic milk, organic milk, fortified with calcium etc

10. CONCLUSIONS:

Innovators in the field of functional food creation have been dairy products. It makes sense for the dairy industry to broaden its product line to include other health-promoting items, as fermented dairy products have long been believed to provide health benefits.In recent years, functional dairy products have gained appeal and become more widely available in daily life. Concerns about consumers' health are fuelling the growth of the global market for functional dairy products. Growth is anticipated to be aided by consumers' growing inclination towards nutrient-dense foods in an effort to get higher levels of nourishment than those found in basic foods. Additionally, functional dairy products have long been linked to probiotic bacteria, organic acids, certain proteins, antioxidants, and highly absorbable calcium. We can conclude that more awareness oriented measures can be undertaken to educate the public about functional dairy products. Special care can be given in designing health claims as they majorly attract the consumers in purchasing functional dairy products. Purchase intention increases with reasons to evaluate, higher the reasons to evaluate higher the purchase intention. Health consciousness was significantly associated with buying functional dairy products.

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Awareness and Challenges of Digital Inclusion for Micro and Small Entrepreneurs in Rural Bangalore

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ABSTRACT

Digitalization, as a concept is not restricted to urban areas but also has been making inroads into rural India and holds the prospect. It has a growing impact on micro and small-scale businesses. The advanced technology and internet accessibility has paved way for the adoption of digital operations in rural areas. This paper aims to find out the awareness and accessibility of digital adoption by micro and small entrepreneurs in their business. It also identifies the challenges faced by them in digitalisation of their businesses. The study uses the sample of 150 entrepreneurs from micro and small enterprises across Bangalore rural areas. The study tries to test the hypothesis by using regression and correlation techniques. This paper also recommends them the ways and means for the improvement of digitalisation of their business.

Key words: Digitalisation, Micro, small entrepreneurs, rural areas

INTRODUCTION

Technological revolution makes the human life very easy and simple. The rapid growth of technology has influenced the global activities and transformed the economic, social and political environment. At the same time the business world also has influenced by ICT application, which helps for the business expansions. With the help of ITC the

67861

Uma Maheswari et al.,

business digitalises' its all activities and it creates opportunities and threats to the small business. The small business like micro and small enterprises take this digital inclusion as a challenge and compete with its competitors.

Digital Inclusion

Digital inclusion is the individuals and groups of people capability to access and use the information and communication technology (ICT) in various business situations on par with the technological transformations. As digital inclusion is not just about computers or the Internet, but it is the usage online and mobile technologies as channels to improve skills, to enhance quality of life, to drive education and to promote economic wellbeing across all elements of society (Australian Digital Inclusion Index, 2015). In addition, digital inclusion enables the various clusters of society, businesses and educational institutions to have access to technology which helps them to use and analyse its current information. The fast internet access enables the digital inclusion to access the information physically. Thus, it provides a bigger opportunity for economic growth with the usage of ICT and also to enhance the relationship with the support systems. (Faradillah Iqmar Omar, Ali Salman & Samsudin A.Rahim, 2015).

The usage of internet and the technological applications in the business is inevitable for the entrepreneurship. In this techno flexi business environment, their survival of the business is based on their digitalisation process and its application in business. Digital inclusion is essential for their business processes as it helps to overcome the cut throat competition by adopting cost-effective marketing techniques and expansion of the potential customers.
According to Asian Development Bank (ADB, 2014), the small and medium-sized enterprises (SMEs) are the backbone of Asian economies and they are very important for contributing to economic development of the country. As the SMEs helping the multinational corporations by suppling its supplementary for the main products, they should be aware about the digital inclusion for dealing with the multinational companies to deliver its operations in a quick mode.

LITERATURE REVIEW

K. Suma Vally and K. Hema Divya examines the impact of adopting digital payments effects on users of banking in India. The report of their study tells us how to increase cashless payment in the country. The result specifies that the adoption of technology for digital payments improves the performance of banking sector. Also it said that banks should take effective measures to create awareness to the customer about the effective utilization of technology and security. Sudiksha Shree, Bhanu Pratap, Rajas Saroy and Sarat Dhal in their research governments, regulators & service-providers are working to improve the e-payment system. Researchers recommended that perception of digital of digital payment tools affects the payment behavior of an individual. Dr.R.KrishnaKumari, Ms.G.Pavithra said through their research said that 24*7 service, time saving, convenience and security helps to strengthen the digital payment system. It helps in cost reduction and simplifies the process of e-payment process. Public is facing fewer problem to use cashless method at present.

Dr. D. S. Borkar, Mr. Avinash Galande cleared that digital payment system is growing faster. There are lot of opportunity in India for digital payment business. Now a days due to the Government initiative in India and banks initiative to provide the awareness among the customer still proper education is required to the customer banks. Presently it has been observed that there is high cost of infrastructure and lack of financial literacy among the people. E-payment system helps the people to maintain the transparency and also helps to security. Dhruvi Bhagat said that pandemic 2020 has impacted the digital payment system and also a game changer for India for digital payments adoption ever since the demonetization in 2016. Author suggests that retail stores must adopt and influence the customer to use the E-payment transaction.

Statement of the Problem

In the current scenario internet place, a major role for the day today activities. The use of internet, digital technology such e transaction, data storage and other business activities are accepted and practices by both entrepreneurs and customers. It will increase the purchasing power of the consumers. In our country there are so many unorganized

sectors, which are mostly live in the poor economic conditions. Micro and Small-Scale Enterprises not only contribute significantly to improved living standards, they also bring about substantial local capital formation and achieve high levels of productivity and capability. Digital inclusion would influence the internal business processes of an organization as well its functions of Indian market. It has its influences to SMEs on their restricting of the infrastructure and resources, in terms of information technology systems, value chain, pricing and others[3]. In Bengaluru north, rural areas many SMEs are contributing more for the economy through their business. In this situation this study takes the initiation to analyze the opinion of entrepreneurs, in SMEs as they are one of the major players in the economic development of any industrial areas like rural areas in Bangalore North.

RESEARCH METHODOLOGY

The research design adopted in this study was a blend of analytical and descriptive in nature. Population of this study has comprised Micro and Small Enterprises (SMEs) under rural areas such as vijipura, Nelamangala, Hosakote, Chikabalapura, Dodabalapura and Kanakapura in North Bengaluru. Convenient sampling method was used to collect the data. In this method 150 registered Enterprises were taken for data collection. With the help of literature review, questions were framed on awareness and the opinion of digital inclusion in SMEs. And the responses to these questions were collected using interview schedule questionnaire method. Data were analyzed by using statistical tools such as frequency, percentage and one way ANOVA.

Objectives:
1. To study the awareness and challenges about the digital inclusion in MSMEs
2. To find the opinion about the digital inclusion among the entrepreneurs of MSMEs
3. To suggest the ways and means for the entrepreneurs about the digital inclusion

Analysis and Interpretation:
This study analyses the awareness about digital inclusion among the entrepreneurs, and the results were as followed in Table 1.

From the above Table 1, the respondents were getting highest awareness about digital inclusion from their friends and relatives. They motivate and due to their pressure others also follow the same.
Digital inclusion also such one such the second highest source is their business circle. If one businessman aware about any business techniques it will be followed by others also.
This study analysis opinion about the digital inclusion among the entrepreneur

In the above Table 2, it was found that 'p' value (level of significance) was less than 0.05 at 1 degrees of freedom. So the hypothesis was rejected for organization and the study proved that the opinion of digital inclusion among the types of organization were differing. In the micro enterprises the entrepreneurs were still in the process of the digital inclusion. Slowly they are transforming to digital inclusion. Among the male and female entrepreneurs, and married and unmarried entrepreneurs, the opinion about digital inclusion are same. The study accepts the null hypothesis for both gender and marital status of the entrepreneurs about their opinion on digital This study analysis the opinion of SMEs that the digital inclusion is benefited for the organization. The study marked their opinion and analysed as followed

In the above Table 3, it was found that 'p' value (level of significance) for income, education, age and trading period was more than 0.05 at 4,5,2 and 3 degrees of freedom. So, the hypothesis was accepted for income, education, age and trading period. The entrepreneurs having same opinion about digital inclusion for their business in spite of their age, income and education. The entrepreneurs have to accept the digital inclusion and if they deviate from the digital inclusion they will away from their business.

FINDINGS

The study has following Findings
- Friends and relatives (37%) and business circle (33%) motivates the entrepreneurs for their digital inclusion.
- The process of digital inclusion, the micro enterprises are slowly transforming their business into the digital inclusion. Most of the small enterprises are already in the process.
- The opinion about the digital inclusion for the business is accepted by both gender and the married and unmarried entrepreneurs.
- The study has found that the entrepreneurs are having the same kind of opinion about digital inclusion, that without that the business cannot move forward.

Suggestion
The government have to encourage the digital inclusion of SMEs by
- To remove the gap of technology adoption by providing SMEs with technology support and assistance.
- To involve more SMEs to adopt digitalisation by encouraging SMEs training and upskilling in the digital technology.
- To give more protection to SMEs by raising the digital security profile of SMEs.
- To access the strategic resources for the digital inclusion easily to SMEs by leveraging fintech and financial assistance

CONCLUSION

Digital transformation is an ongoing process that is constantly evolving and business enterprises that embrace digital transformation will be better positioned to compete in the future and deliver value to their customers. The SME entrepreneurs need to think quickly and adapt the changes in a dynamic way. The companies to achieve success should keep a step ahead in utilizing the opportunities arising out of the changes in the information and technology.

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Table 1. Awareness about Digital Inclusion

Sl No	Sources	No of Respondent	Percentage
1	Social media	34	23
2	Friends and relatives	55	37
3	Magazine and newspaper	7	04
4	Telephone/ radio	5	03
5	Business circle	49	33

Table 2 One Sample T Test for Digital Inclusion and Entrepreneurship

particular	Type of Organisation	N	Mean	S.D	Mean Diff	't' value	Sig.
Gender	Male	116	2.23	0.44	148	1.159	0.248
	Female	34	2.13	0.35	65.602		
Marital Status	Married	126	2.212	.4361	147	0.427	0.670
	Un married	24	2.171	.3484	35.865		
Orgainsation	Micro	90	2.122	.3716	148	-2.898	0.003
	Small	60	2.329	.4632	107.394		

Table 3 Opinion about the Digital Inclusion Among the SMEs.

Particular	Types	N	Mean	S. D	Source of Variance	Mean Square	'F'	Sig.
Income	Less than 200	1	1.765	-.	Between Groups	.341	1.970	.102
	201-500	29	2.304	.3305				
	501-700	29	2.318	.4498				
	701-1000	34	2.196	.2727	Within Groups	.173		
	Above 1000	57	2.110	.4991				
Education	Uneducated	4	2.103	.2897	Between Groups	.223	1.269	.275
	Primary	4	2.103	.2371				
	Middle	8	2.463	.5074				
	SSLC	20	2.094	.3002				
	PUC	35	2.286	.5148	Within Groups	.176		
	Graduation	60	2.153	.4096				
	Any Other	28	3.987	.7804				
Age	Below 25	14	2.193	.2839	Between Groups	.003	.018	.982
	26 to 40	99	2.210	.4479				
	Above 40	37	2.197	.4007	Within Groups	.003		
Trading Period (in years)	Less than 5	41	2.176	.3190	Between Groups	.355	2.055	.090
	6 to 10	57	2.243	.4165				
	11 to 15	31	2.106	.5054	Within Groups	0.173		
	More than 15	19	2.368	.4488				

67865

The Effect of Supportive Leadership on Employee Endurance and Organisational Absurdity in the Workplace

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ABSTRACT

The modern workplace frequently exposes workers to difficult and perplexing situations that require a high level of endurance and fortitude to cope successfully. Employees must contend with challenging circumstances that force them to navigate ambiguity, uncertainty, and seemingly ludicrous situations in this fast-paced and dynamic work environment. This study intends to evaluate the relationship between leadership traits, employee endurance, and its consequences on perceptions of controlling absurdism in light of the significance of employee well-being and job satisfaction for organisational performance. This study also attempts to investigate how leadership influences the relationship between employee endurance and controlling absurdity at work.

Keywords: Supportive Leadership, Employee Endurance & Controlling Absurdism

INTRODUCTION

Employee performance and well-being at work can include a variety of factors, including employee endurance. It describes an employee's capacity to work longer, more productive shifts in challenging or stressful circumstances. They will have the endurance to work hard for lengthy periods of time. Even in difficult circumstances, their stamina won't be compromised. Even if they become burned out, the performance did not deteriorate. In the workplace, endurance is a valuable trait in employees. It emphasises continued work and output. Low employee endurance can be attributed to when an employee is burned out, unproductive, or unhappy. They might intend to perform poorly, be highly absentees, be disloyal or turnover intentions. A high level of employee endurance may indicate that a worker is motivated, effective, content, or resilient at work. They might aim for high productivity, low absenteeism, high loyalty, or low turnover. High employee endurance, meanwhile, can also increase the risk of overwork, stress, or tiredness if the worker has adequate resources, support, or a healthy work-life balance. Finding a healthy level of employee endurance that is compatible with the employee's demands and objectives is crucial for every organisation. Employee endurance can be viewed of and identified in terms of a variety of elements that represent various facets of their capacity to maintain effort and performance across time.

Absurdism in the work place is the belief that tasks are pointless and senseless, and that any attempt to give them a purpose or meaning will only lead to a clash with reality. The Oxford Dictionary (2019) defines 'absurd' as wildly unreasonable, illogical or inappropriate It may also be used to describe actions or procedures that are counterproductive, inconsistent, or unreasonable in the workplace. Absurd practices transcend formal logic or reason (Loacker and Peters, 2015) and tend to be harmful, as they undermine the dignity of people (Bal et al., 2023).Employees may receive contradictory messages or instructions as a result of improper communication or understanding of information. They may experience difficulties as a result of overly complicated processes and strict rules, which can make them feel caught in an endless series of paperwork and permissions. They may become dissatisfied with as a result of inconsistent corporate policies or practises as they try to understand the regulations they must abide by; they believe their abilities are not appreciated or valued if their managers are overly controlling or micromanaging and Politics and favouritism in the workplace can result in irrational judgements that put interpersonal relationships before performance or merit

Employers may assist employees in acquiring resilience and dealing with absurd circumstances to increase productivity and their general well-being with the help of compassionate leaders. The company must make sure that the managers and supervisors set a good example. They build team trust and confidence by displaying fortitude and practical problem-solving in the face of absurd circumstances. As a result, leadership qualities can increase workers endurance and give the teams members the tools they need to better manage and control absurdity. This can therefore result in a more adaptable workforce that can succeed even in difficult circumstances. As a result, it may be argued that supportive leadership demonstrates a beneficial association between maintaining employee endurance and reining in absurdity at work.

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┌──────────────┐      ┌──────────────┐      ┌──────────────┐
│  Supportive  │ ───▶ │   Employee   │ ───▶ │ Controlling  │
│  Leadership  │      │   Endurance  │      │  Absurdism   │
└──────────────┘      └──────────────┘      └──────────────┘
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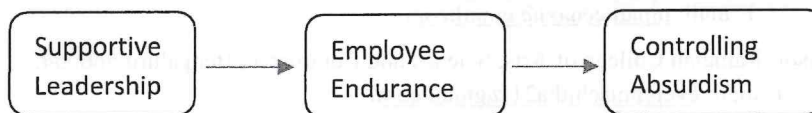
REVIEW OF LITERATURE

Khin Marlar Win (2016) in his study mentioned that there are two main functions of leaders in the organisation one is retention of the skilful employees and employees' performance. He also said that the behaviour of the leader has an effect on the work outcomes and leaders should influence others to achieve the organisation goal. Therefore, the leadership style will be important to improve the individual employee work performance.

Ethe and et al., (2012) also defined that leadership is the ability of a person who can influence the behaviours or actions of other people for the purpose of achieving goals and to maximize outcomes in the organization.

Matthijs Bal and et al., in their study mentioned that, the lens of absurdity helps to understand wider phenomena, including inequality and marginalisation, and climate inertia. This study concluded that absurdity sometimes resulted positive social changes, through problematization, resistance and imagination.

Ghadah Alarifi and Nawal Abdalla Adam (2023), According to their research, managers in small and medium-sized businesses must practise participative leadership in order to foster employees' innovative behaviour and guarantee the viability of their businesses. Additionally, this study drawn the conclusion that participative leadership acted as a mediator between innovative employee behaviour and long-term company viability.

STATEMENT OF THE PROBLEM

Absurdity in the workplace is the common issues in techno flexi work environment, which can be control by the combination of strong leadership, open communication, and a readiness to change and grow. Organisations must actively encourage transparency, facilitate clear communication, and develop a culture of support in order to lessen the appearance of absurdity and cultivate a workforce that is both productive and engaged. Creating an environment that supports resilience, adaptability, and an optimistic attitude is essential to this endeavour because it establishes a link between employee endurance and the decline in workplace absurdity. By assisting the employees in developing resilience and handling absurd situations skilfully, managers or supervisors can boost productivity, increase job satisfaction, and enhance general welfare.

OBJECTIVE OF THE STUDY

➢ To examine the significant relationship existing between employee endurance and supportive leadership in the workplace of different industries in urban Bengaluru,

➢ To investigate any significant impact of supportive leadership and employee endurance on controlling absurdism

➢ To suggests the ways and means for effective work environment by controlling absurdism in the workplace.

This study has analysed the supportive leadership practices used by managers or supervisors increases the employee endurance and reduce workplace absurdity. For that, it has framed thenull hypothesis based on the objectives as follows;

NULL HYPOTHESES

H0: There is no significant relationship between the employee endurance and supportiveleadership

H0: There is no positive relationship between the supportive leadership employee enduranceand controlling the absurdism in the work place which leads to job satisfaction

RESEARCH METHODOLOGY

This paper is blend of descriptive and empirical in nature. This study collected data throughprimary sources using questionnaire. The respondents were the employees of manufacturing

and service Industries, Bengaluru Urban. The sample size is 400. The study uses the convenientsampling method. To collect the data the study analysed the literature and framed the questionnaire related to the supportive leadership, employee endurance and controlling absurdism in the work place. It used five-point Likert scales to collect the opinion of the employees about the independent variable's supportive leadership, employee endurance and the dependent variable controlling absurdism. The study analysed the collected data, through correlation and multiple regression methods.

ANALYSIS

This study analysed the relationship between Leadership and Employee Endurance. Theresults are as follows,

TABLE 1
RELATIONSHIP BETWEEN SUPPORTIVE LEADERSHIP AND EMPLOYEEENDURANCE

		Leadership	Employee Endurance
Leadership	Pearson Correlation	1	.533**
	Sig. (2-tailed)		.000
	N	400	400
Employee Endurance	Pearson Correlation	.533**	1
	Sig. (2-tailed)	.000	
	N	400	400

**. Correlation is significant at the 0.01 level (2-tailed).

The result of the above table shows that, there is a correlation between supportive leadership and Employee Endurance as the significant level is less than 0.05.
The study further analysed that the supportive leadership and endurance has an impact on controlling the absurdism in the workplace, using multiple regression method and the results are as follows

TABLE 2 MODEL SUMMARY

Model	R	R Square	Adjusted R Square	Std. Error of theEstimate
1	.628ᵃ	.394	.361	.35335

a. Predictors: (Constant), Employee Endurance, Leadership

From the above Table 2 the study has found that, the R -value 0.628 represents the correlation between the dependent and independent variable. The value is greater than 0.4 therefore the model is good.

The R-Square value 0.394 shows the total variation for the dependent variable that could be explained by the independent variables. This shows that the model is effective enough to determine the relationship.

The Adjusted R-Square value 0.361 is not far from 0.394, the difference between R Square andAdjusted R square is minimum hence the variation of the sample results from the population in multiple regression

TABLE 3ANOVA

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	3.005	2	1.503	12.035	.000ᵇ
	Residual	4.620	397	0.125		
	Total	7,625	399			

a.   Dependent Variable: Controlling Absurdism

b.   Predictors: (Constant), Employee Endurance, Leadership

From the above table P value is .000 at 5 per cent significance level and F value is greaterthan 1 the model is fit. The study has found that the null hypothesis is accepted as P valueis less than 0.05.

TABLE 4

EFFECT ON SUPPORTIVE LEADERSHIP AND EMPLOYEE ENDURANCE

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95% Confidence Interval for B	
		B	Std. Error	Beta			Lower Bound	Upper Bound
1	(Constant)	1.771	.547		3.129	.003	.603	2.818
	Supportive Leadership	.043	.064	.089	.666	.509	-.087	.172
	Employee Endurance	.567	.126	.598	4.495	.000	.311	.823

a. Dependent Variable: Controlling Absurdism

Results of Table 4 Showed that, Null Hypothesis accepted for supportive leadership as P value is greater than 0.05 (0.509>0.05). It has showed that "There is no significant relationshipbetween the supportive leadership and controlling the absurdism in the work place". At the same time, it rejects the null hypothesis for employee endurance and accept

the alternative hypothesis as P value is less than .05 (.000<.005). It showed that "There is a significant relationship between employee endurance and absurdism". Therefore, the above result suggest that the supportive leadership has less impact in controlling absurdism and employee endurance alone has more impact in controlling absurdism in the work place

FINDINGS

1.   According to the study's hypothesis, supportive leadership and employee endurance arepositively connected. This means that staff members are more likely to persevere through difficulties and maintain their commitment to their work when leaders are helpful and create a favourable work environment.

2.   Controlling absurdity at work is positively connected with employee endurance. This shows that employees' ability to continue and stay focused can help to reduce or regulate absurdism, which can refer to circumstances or behaviours that affect the efficiency and understandable functioning of the workplace.

3.   There is no statistically significant link between supportive leadership and controlling in absurdity. This indicates that the level of absurdity at work does not seem to be directly impacted by the availability or absence of support from leadership.

CONCLUSIONS

According to the research, developing supportive leadership may effect on employee endurance. Employees are more likely to help regulate or mitigate absurdity in the workplace when they are better equipped to handle difficulties. This suggests that companies should think about encouraging supportive leadership practises as a way to encourage employee resiliency and, indirectly, create a more sensible and productive workplace with less absurdity.

Furthermore, it implies that while supportive leadership is clearly advantageous for a variety of workplace factors, absurdity in the workplace may not be directly influenced by it. Other aspects of the workplace, such as organisational culture, staff attitudes, or outside forces, may also have an impact on absurdity. Organisations shouldn't just rely on encouraging leadership to deal with or manage absurdity. In order to effectively combat absurdism, they may need to look into alternative approaches and interventions, such as fostering an environment of open communication, outlining clear expectations, or putting in place particular policies and procedures. Additionally, further study may be required to comprehend the causes of absurdismand the best ways to deal with them.

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A STUDY ON ASSESSING DETERMINANTS OF DEPOSIT VOLUME BY ADOPTING THE CAMELS RATING SYSTEM OF SELECTED PRIVATE INDIAN BANKS

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Abstract

In our study, we focus on evaluating the CAMEL rating system, a well-established method for assessing the performance of banks, specifically within the context of the private banking sector. Our primary objectives in this research are to ascertain the rankings of these private banks based on both CAMEL composite and CAMEL overall ratings and to investigate how these ratings correlate with the total deposits of these banks over the period spanning from 2018 to 2022. Our methodology encompasses four distinct phases. In the initial phase, we compute the essential financial ratios that constitute the CAMEL composites for each bank. In the subsequent phase, we assign rankings from 1 to 5 to each bank according to their performance in each CAMEL composite for each year under consideration. In the third phase, we determine the overall rankings of private banks based on the CAMEL composite and CAMEL overall assessments. Lastly, in the fourth phase, we employ a regression model, with the CAMEL financial ratios' rankings as independent variables and the total deposits of the banks as the dependent variable. By utilizing the stepwise regression method, our results demonstrate that the most effective regression model yields an adjusted R-squared value of 73.4% and a standard error of approximately 0.58. Our findings indicate several key insights. Firstly, capital, as measured by the Capital Adequacy Ratio (CAR), and management efficiency, represented by an efficiency ratio, both have positive effects on banks' total deposits. Earnings, specifically through the Return on Equity (ROE) proxy, and liquidity, as indicated by the loans to deposits ratio, also exert positive influences on total deposits. Conversely, earnings, calculated as the net interest income to net revenue ratio, and liquidity, assessed through the Cost of Current and Savings Accounts (CASA), have a negative impact on total deposits. Notably, other ratios related to asset quality and the remaining financial metrics do not appear to significantly affect total deposits in the case of banks.

INTRODUCTION

The banking sector plays a critical role in the economy, as it serves as a key financial performer and a reflection of other sectors. It acts as a vital channel for increasing cumulative investments and promoting economic activities and growth. By encouraging savings and mobilizing public savings, the banking sector contributes to the overall development of the economy. Therefore, the success of the economy relies on the effective performance of the banking sector. Banks form the foundation of the modern economy and have a pivotal role in facilitating the transmission of monetary policy, which in turn contributes to stability and fosters economic growth. The significance of banks stems from their function as financial institutions that accept public deposits and utilize them in various banking products, particularly by providing loans to customers to generate interest income. Deposits and loans are fundamental components of a bank's balance sheet, with deposits being a relatively cost-effective source of funds and loans being the primary application of these funds. However, the expansion of deposits is reliant on the financial strength of banks, which can further enhance trust in the institution. Conversely, the increase in loan volumes should be associated with clients who possess high credit ratings.

Rating systems play a crucial role in anticipating the potential bankruptcy of various parties. Banks utilize these systems to objectively and accurately evaluate the creditworthiness of their clients, enabling them to predict the likelihood of client bankruptcy in advance (WuF, SuX et.al. (2021). Central banks utilize rating systems because they bear the responsibility of overseeing and regulating the financial system of a country[1]. These rating systems play a crucial role in assessing and evaluating the health and stability of banks. By assigning ratings to banks, central banks can determine the level of direct supervision that each individual bank requires[1]. This allows central banks to allocate their resources and attention accordingly, prioritizing their oversight efforts based on the risk profile of each bank.

Furthermore, the ratings assigned by central banks serve to enhance depositors' trust in banks[1]. When depositors see that a bank has received a favorable rating from the central bank, it instills confidence and reassurance in the bank's financial soundness and stability. This, in turn, helps to foster trust in the banking system as a whole. Central bank regulations are essential for economic and social stability and to prevent banks from taking risks or making mistakes that could damage the banking system and the economy as a whole. Regulations should also help make banks more financially sound and make it easier for them to compete with each other (Noman et.al, 2021; Ngotran, 2021).

The idea of looking at how banks work and how they operate was first put into practice in the US with the USFIR. Regulators and central banks around the world started using CAMEL as a way to measure how strong and weak banks are and to decide how much supervision is needed for each bank.

Camel rating system (CAMEL) is the acronym for the 5 assessment composites: Capital Asset Quality Management Quality Earnings Quality Liquidity These ratings are highly

relevant to depositors, as they can increase their confidence in banks and safeguard their wealth.

Our objective in this study is to identify the factors that influence bank deposits through the use of CAMEL composite rankings and the overall ranking of Indian private banks. The Indian Private Banking System is one of the largest banking sectors in India, accounting for 34% of total banking assets in the region. The Bank Index NIFTY is the benchmark sector index in the India n Banking Stock.

This paper presents a comprehensive analysis focusing on the influence of CAMEL ratios on the total deposits of Indian private banks. The key findings of this study encompass the ranking of each bank with respect to CAMEL ratios ranging from 1 to 5, covering the period from 2018 to 2022. We also rank the banks based on individual CAMEL components and establish an overall ranking by averaging these rankings over the 2018-2022 timeframe. Furthermore, we identify which specific CAMEL components exert the most pronounced impact on the total deposits of private banks. In addition to this empirical analysis, the paper examines into the most substantial theoretical and literature reviews concerning the CAMEL framework and its application within the banking sector.

LITERATURE REVIEW

Singhal P K et.al, (2020) describe banks play a crucial role as a fundamental pillar of any economy and are intricately interconnected with the financial systems that underpin economic activities. Despite banks operating within the same country and sharing a common economic environment, substantial differences in their performance can be readily evident, as observed in (Biswas,2020).

CAMELS as overall rating systems and its impact on performance of banks

CAMEL's rating scale for banks ranges from 1 to 5, with 1 representing strong performance and excellent risk management practices, and 5 denoting the lowest rating, indicating the poorest performance and a lack of risk management practices.

Numerous researchers have employed the CAMEL model to assess and rank both public and private banks Suman et.al (2019). The examination of the financial performance of both public and private banks was conducted to determine their rankings, which were based on the five CAMEL composite factors and their overall rankings. Vadrale K S (2019) analyzed that three of the CAMEL composites, specifically asset quality, earnings quality, and management efficiency, private banks demonstrated superior performance. Conversely, public banks outperformed in the liquidity composite. But Singhal P K (2019) was observed that public banks have prioritized boosting their capital composites to achieve a suitable capital level. However, there is a need for them to explore more innovative strategies to allocate their funds effectively and optimize their profitability. Sharma G, and Sharma D (2017) research revealed that private banks outperform public banks exclusively in the areas of management efficiency and earnings quality. In the remaining CAMEL composites, both categories of banks exhibit similar performance levels. Furthermore, other scholars have explored distinctions between conventional and

Islamic banks through the utilization of the CAMEL model. The research findings indicated that, in accordance with the CAMEL model, conventional banks displayed superior performance compared to Islamic banks. Lastly, it's worth noting that the CAMEL model is widely recognized and extensively employed by researchers to evaluate the financial performance of banks. Additionally, numerous central banks around the world rely on it to assess the standing of banks (Hewaidy A M.et.al,2020; Saif-Alyousf, 2017). PekkayaM and Erol F (2019) discovers made that the CAMEL model has the potential to serve as a foundation for creating an early warning system to predict potential bank failures.

- Dr. Milind Sathye (2005) paper conducted an analysis to determine the production efficiency scores of Indian banks for the year 1997-98. These scores were computed using the non-parametric Data Envelopment Analysis method. The results of the study indicate that, according to Model A, Public sector banks exhibited a higher average efficiency score in comparison to private sector and foreign commercial banks operating in India. However, based on Model B, while public sector banks had lower average efficiency scores than foreign banks, they still outperformed private sector commercial banks in terms of efficiency. In the study conducted by Mr. Santosh Kumar and Dr. (Mrs.) Roopali Sharma in 2016, a ranking of sample banks was performed based on CAMELS parameters, leading to the following key findings:

✓ Kotak Mahindra Bank secured the top position in terms of capital adequacy, with ICICI Bank following closely.

✓ SBI had the highest non-performing asset (NPA) levels within its peer group, with ICICI Bank coming in second.

✓ PNB demonstrated exceptional management efficiency, earning the highest grade in this parameter.

✓ SBI and PNB both excelled in terms of earning quality.

✓ Kotak Mahindra and ICICI exhibited remarkable efficiency in managing their liquidity.

✓ The comprehensive performance assessment ranked SBI in the first position, followed by PNB and HDFC Bank.

- Sudeep Kalakkar (2014) underscored the significance of capital adequacy requirements and the strategies employed by banks to bolster their capital ratios. The study emphasized that rating agencies, employing the CAMELS model, gave particular attention to the capital adequacy ratios of banks when assigning ratings to their certificate of deposits, fixed deposits, and bonds.

- Additionally, the study noted that the implementation of Basel II had the potential to enhance the risk management systems of banks. This was because banks were striving to maintain sufficient capital to mitigate underlying credit risks and fortify the overall financial stability of the country. In the Indian context, in the short term, commercial banks might need to increase their regulatory capital levels to comply

with Basel II requirements. Nevertheless, in the long term, they stood to benefit from improved operational and credit risk management practices.

- Mr.Nandan Velenkar, Ms. Surbhi Pahuja (2019) using The rating model examined the factors that impacted the performance of both Islamic and conventional banks in the United Arab Emirates (UAE) from 1996 to 2008. The findings of the study indicated that for conventional banks, factors such as liquidity and concentration played a pivotal role in determining their performance. Conversely, for Islamic banks, the performance was notably influenced by cost and the number of branches.

- Mr.Parvesh Kumar Aspal1, and et al-(2019), studied - A robust financial system plays a crucial role in driving a country's economic development. Within this financial system, the banking sector stands as a vital component. Hence, the economic significance of banks cannot be understated. Evaluating the performance of the banking system serves as an effective method and indicator to assess the overall health of a nation's financial system.

- The primary goal of the current study was to investigate how bank-specific factors and macroeconomic factors collectively impact the performance of private sector banks in India.

- Ms.Madhavi, and Dr.Amit Srivastava, (March-2019) Studied The study employed the CAMEL framework, consisting of five key parameters: Capital Adequacy, Asset Quality, Management Efficiency, Earning Quality, and Liquidity. Additionally, Data Envelopment Analysis (DEA) was conducted to assess the productive efficiency of banks, gauging their potential.

The research aimed to validate a bankruptcy model through the analysis of RBI announcements regarding bank mergers and winding up. Furthermore, the study endeavored to develop a model called the Swing Trading Model, leveraging Non-Performing Assets (NPA) as a catalyst. This was done with the objective of minimizing losses and maximizing returns for shareholders and traders, particularly in adverse scenarios of banking performance.

The study encompassed 41 banks from various segments of the banking sector, including public banks, private banks, and foreign banks, spanning the years 2001 to 2016.

Mr. Parveen Chauhan (2019) examined of the performance of foreign banks in 10 European nations was conducted, encompassing a total of 319 banks. The study revealed that the presence of foreign banks had a detrimental impact on the revenue of domestic banks, affecting both non-interest income and interest income derived from assets, along with overall profitability. Additionally, the study identified an increase in overhead costs and heightened competition with domestic banks as a result of the entry of foreign banks, particularly in the short term.

Mr.Nandan Velenkar, Ms. Surbhi Pahuja (2019) studied The study employed a regression model within E-views to investigate the causal relationship between variables. The

findings of the study demonstrated that the cost associated with human capital exerts a significant influence on the financial performance of private sector banks in India.

Mr. Parveen Chauhan (2019) studied the comprised two distinct stages. In the initial stage, the research focused on evaluating efficiency, examining shifts in banking structure and concentration. In the subsequent stage, the aim was to identify the factors influencing banking efficiency and concentration, both at the bank-specific and country-level contexts.

Mr. Pushkala Narasimhan and K.A Venkatesh (2019) analysed Over the past decade, a substantial body of literature has emerged, employing Data Envelopment Analysis (DEA) to assess the efficiency of diverse industrial sectors. In our study, we have applied a two-stage DEA approach to evaluate the efficiencies of both public and private sector banks, within the framework of OBS (Operations and Banking Services).

Dr. Arasu Raja, (2019) studied In the age of technological advancement, an ongoing commitment to learning is imperative for the workforce, regardless of their industry. This need extends even to public sector enterprises, which must compete with their private sector counterparts. In this context, the rising technology of e-learning systems in India has emerged as a means to facilitate continuous learning through the internet and electronic networks.

The principal objective of this research is to assess how the quality of e-learning systems influences the organizational performance of specific public sector banks located in Chennai city.

Methodology

To address our research questions, we will begin by establishing the CAMEL ranking for a selection of private banks. This ranking is crucial, as the Reserve Bank of India has imposed stringent regulations to evaluate and ensure the financial stability and strength of these banks. The goal is to determine the appropriate level of supervision and oversight required for each bank. It's worth noting that all the selected banks have exhibited strong financial performance, characterized by high rankings and excellent financial ratios.

Our approach involves simulating the CAMEL model ranking by thoroughly analyzing specific financial ratios associated with each CAMEL composite. Subsequently, we will rank the Private banks based on these financial ratios and further categorize them within each CAMEL composite. This process will culminate in assigning an overall CAMEL rank to each private bank.

Collection of data

Our research began with the calculation of financial ratios corresponding to the CAMEL model composites, which include Capital, Assets Quality, Management Quality, Earnings Quality, and Liquidity. These ratios were analyzed for a total of five Private banks, over the period spanning from 2018 to 2022.

To investigate the impact of the CAMEL model on banks' total deposits, we computed a range of financial ratios for each bank over the same period:

- **Capital Ratios:** Total Capital Adequacy Ratio (CAR), CAR Tier 1

- **Asset Quality Ratios:** Loan Losses to Total Loans (LL/TL), Loan Losses to Total Equity (LL/TE)

- **Management Ratios:** Net Profit per Employee, Efficiency Ratio, Earnings Growth

- **Earnings Ratios:** Return on Assets (ROA), Return on Equity (ROE), Net Interest Income to Total Assets (NII/TA), Net Interest Income to Net Revenue (NII/NR)

- **Liquidity Ratios:** Loans to Deposits (LTD), Current and Saving Accounts to Total Deposits (CASA)

These financial ratios were used as indicators of the financial health and performance of the banks under study. By examining these ratios over the specified period, we aimed to gain insights into how the CAMEL model and its individual components influence the total deposits held by these banks.

Ranks based on the financial ratios derived from the CAMEL model

We will employ the financial ratios calculated for the period spanning 2018 to 2022 to compute the mean of each ratio for every bank in our study. Subsequently, we will assign ranks to the banks, ranging from 1 to 5, based on their respective average ratios. In this ranking system, a rank of 1 signifies the bank with the most favorable ratio, while a rank of 5 indicates the bank with the least favorable ratio.

Table 1: shows ranks of private banks by means of CAMEL (Capital Asset Quality Management Quality)

Bank	CAR total	CAR tier 1	LL/TL	LL/TE	Net profit of each employee	Efficiency ratio	Earnings growth
HDFC	1	1	1	2	4	5	1
ICICI	2	2	5	3	3	4	2
AXIS	3	3	4	1	1	2	4
Kotak	5	4	3	5	5	1	5
IndusInd	4	5	2	4	2	3	3

We will compute the average ratios over the 2018-2022 period for each bank and rank them from 1 to 5 based on these average ratios, following a methodology used by Singhal in 2020, as depicted in Table 1. The rankings range from 1, indicating the best ratio, to 5, denoting the lowest ratio.

In line with the Basel III Accords, the measurement of a bank's capital is accomplished through capital adequacy ratios, which include total and tier 1 capital adequacy ratios (CAR). These ratios are calculated by dividing a bank's capital by its risk-weighted assets. A bank's capital comprises tiers I, II, and III, with Tier 1 encompassing shareholders' equity and retained earnings. The denominator in CAR ratios consists of risk-weighted assets, which encompass operational, credit, and market risk. Central banks enforce CAR

(total and tier 1) ratios based on Basel Accord recommendations, with the stipulation that total CAR should not fall below 10.5% and tier 1 should not be lower than 6%. CAR ratios hold great significance for regulatory bodies as they ensure that a bank's capital can absorb a reasonable amount of loss, thereby safeguarding against excessive risk and insolvency. These ratios, in turn, protect depositors and contribute to the stability and soundness of the financial sector, both domestically and internationally.

Our analysis, presented in Table 1, reveals that HDFC Bank boasts the highest CAR ratios, while Kotak Bank and IndusInd Bank exhibit the lowest CAR and CAR tier 1 ratios, respectively.

When considering the asset quality of banks, it's closely related to the quality of loans within their portfolio. This is vital for enhancing the overall stability and profitability of the bank. Loans are categorized into performing loans (PL) and non-performing loans (NPL), with NPL representing loans where the borrower has not made scheduled payments for 90 days. Our study focuses on loan loss ratios, which signify the losses incurred by banks when loans are not repaid. According to the asset quality proxies presented in Table 1, HDFC Bank shines with the best asset ratios and the lowest loan loss ratios, whereas Bank IndusInd ranks the lowest. Turning to management ratios, these metrics gauge the management's ability to effectively oversee the bank's core activities and funds. Key management ratios include the efficiency ratio, which reflects the bank's ability to make efficient use of its funds, and indicators of the bank's profit maximization capabilities such as net profit per employee, efficiency ratio, and earnings growth. Our analysis indicates that Kotak Bank leads in net profit per employee and efficiency ratio, while HDFC Bank and ICICI Bank trail in efficiency ratio and net profit per employee, respectively. Lastly, HDFC Bank demonstrates the highest earnings growth compared to the other banks in the analysis.

Table 2: shows ranks of private banks in terms of CAMEL Composites (Equity, Liquidity)

Bank	ROA	ROE	NII/TA	NII/NR	LTD	CASA
HDFC	5	5	2	1	1	3
ICICI	1	1	1	5	4	1
AXIS	3	4	4	4	5	3
Kotak	2	3	3	2	2	5
IndusInd	4	2	5	3	3	4

Table 2 highlights the significance of Earnings as a primary Key Performance Indicator (KPI) for any institution, with ROA (Return on Assets) and ROE (Return on Equity) serving as crucial indicators of profitability. Additionally, within the banking sector, there are specialized earnings ratios, notably Net Interest Income to Total Assets (NII/TA) and Net Interest Income to Net Revenue (NII/NR). Net interest income stands out as the most critical component in the income statements of banks and serves as their primary source of revenue. Using proxy measures for ROA, ROE, and NII/TA, ICICI Bank emerges with the highest ratios, while IndusInd Bank, HDFC Bank, and Kotak Bank show the lowest

ratios for these indicators. Concerning NII/NR, HDFC Bank reports the highest figure, with AXIS Bank at the opposite end of the spectrum.

Liquidity pertains to a bank's capability to meet its current liabilities with its current assets. Bank liquidity ratios encompass Loans to Deposits (LTD) and Current and Savings Accounts to Total Deposits (CASA). Notably, HDFC Bank demonstrates the most favorable LTD ratio, while AXIS Bank presents the lowest LTD ratio. In terms of CASA, ICICI Bank leads with the highest ratio, while IndusInd bank has the lowest CASA ratio.

Data Analysis & Outcomes

Ranks based on CAMEL composites and overall rank

Table 3. Overall ranking of private banks using CAMEL

Bank	C	A	M	E	L	CAMEL
HDFC	1.2	1.0	4.9	3.5	4.5	2.9
ICICI	2.6	2.0	3.6	2.6	5.0	3.8
AXIS	2.6	4.0	2.8	3.6	3.2	3.9
Kotak	3.5	3.5	1.0	4.6	2.5	4.2
IndusInd	4.5	5.0	4.0	1.7	1.9	4.9

To determine the rankings of selected private banks based on CAMEL composites and CAMEL's overall assessment, we employed a method of averaging the ranks of individual financial ratios within each composite of CAMEL composites. Specifically, for the Capital composite, we averaged the rankings of "CAR and CAR tier 1" for each bank to derive the Capital ranking, as displayed in Table 3.

In the CAMEL composite ranking, HDFC Bank excelled with the highest rankings in Capital and Assets ratios, while Kotak Bank showcased the best Management quality ratios. For Earnings ratios, IndusInd Bank emerged as the leader with the highest average earnings ratios. IndusInd Bank also secured the top position in Liquidity ratios.

To establish the banks' overall rankings according to CAMEL, we computed the average of the five CAMEL composites. These calculations revealed that HDFC Bank achieved the highest CAMEL overall ranking, closely followed by ICICI Bank, while Bank IndusInd obtained the lowest CAMEL overall ranking.

Regression Analysis

Table-4 shows the regression analysis of CAMEL rating of Private Banks on deposits

Model	Predictors Efficiency Ratios	R	R squared	Std. Error
1	Efficiency Ratio	0.692	0.479	0.82
2	CASA	0.785	0.616	0.71
3	CASA NII/NR	0.821	0.674	0.66
4	CASA NII/NR, LTD,	0.844	0.712	0.63
5	CASA NII/NR, LTD, CAR,	0.858	0.736	0.61
6	CASA NII/NR, LTD, CAR, ROE.	0.874	0.764	0.58

Table-5 shows the ANOVA test of the linear regression model on deposits

	Sum of Squares	df	Mean square	F
1	38.75	1	32.759	48.9
2	42.1	2	21.04	41.71
3	46.01	3	15.34	35.1
4	48.5	4	12.2	30.1
5	50.1	5	10.1	27.4
6	53.1	6	8.7	25.9

Tables 4 and 5 further illustrate the impact of Capital composite, as measured by CAR (Capital Adequacy Ratio), on total deposits. A high CAR signifies greater efficiency and stability, reducing the risk of a bank's insolvency and ensuring that it can meet its financial obligations. Consequently, a high CAR instills more confidence in depositors, leading them to deposit more funds in the bank. It's worth noting that our findings reveal a significant positive effect of Capital ratios on total deposits, which is not in line with research that reported a negative and insignificant influence on total deposits.

Additionally, our results show that the Management composite has a positive effect on overall management, as measured by the efficiency ratio, and its impact on total deposits. Efficiency is a critical key performance indicator (KPI) for banks because it reflects the bank's ability to efficiently utilize funds and deposits. Effective utilization translates to increased profitability for banks and maximized wealth for shareholders. Earnings, as an indicator of good management and efficient fund handling, also exhibit a positive influence on total deposits, as measured by ROE (Return on Equity).

However, our analysis did reveal a negative impact of earnings, measured by NII/NR (Net Interest Income to Net Revenue), on total deposits. This result contrasts with research that found a negative effect on the profitability of total deposits.

DISCUSSION

Our study aims to investigate the impact of the CAMEL ranking on the total deposits of Indian private banks during the period spanning from 2018 to 2022. We have utilized various financial ratios as indicators of the CAMEL ranking. These ratios encompass:

- **Capital Adequacy Ratios**: These are represented by Capital Adequacy Ratio (CAR) and CAR Tier 1. Notably, HDFC Bank displayed the highest CAR ratios, indicating strong capital adequacy, while IndusInd Bank had the lowest CAR ratios.

- **Asset Quality Ratios**: These include Loan Losses to Total Loans (LL/TL) and Loan Losses to Total Equity (LL/TE). Bank IndusInd was found to have the most favorable asset quality, with the lowest rankings in these categories.

- **Management Ratios:** Net Profit per Employee and Efficiency Ratio were used as measures of management effectiveness. Axis Bank excelled with the highest net profit per employee and the most efficient operations. Conversely, Bank IndusInd ranked lowest in both these categories.

- **Earnings Ratios:** Return on Assets (ROA), Return on Equity (ROE), Net Interest Income to Total Assets (NII/TA), and Net Interest Income to Net Revenue (NII/NR) were employed as earnings indicators. HDFC Bank demonstrated the highest earnings growth, whereas IndusInd Investment Bank had the lowest earnings growth.

- **Liquidity Proxies:** We used Long-Term Debt (LTD) and Non-Interest Income to Total Deposits (NON-IID/TD) as proxies for liquidity, although detailed results for these ratios are not provided.

In summary, our analysis highlights the variations in the CAMEL ranking indicators among Indian private banks over the specified period. These findings shed light on the relative financial health and performance of these banks, which can have implications for their total deposits and overall financial stability.

Limitation and further study

This paper has some limitations such as the paper is focus on quantitative approach than the qualitative and future studies can be done for public banks and combination of both public and private banks. Also, the results of this study can be improved by considering sensitivity analysis. The CAMEL study is also done for with other models

Implications

The findings of this study have the potential to instill greater confidence among bank depositors, bolstering trust in the private banking sector. Furthermore, investors stand to gain by considering investments in the stocks of these resilient banks, thereby increasing their potential returns.

In addition, the study offers valuable insights for policymakers within the private bank and regulatory authorities. They can leverage the bank rankings provided in this study to develop early warning systems for financial institutions. Such systems will streamline the supervision processes conducted by various regulatory bodies overseeing all banks. This, in turn, will contribute to fortifying the robustness and resilience of the banking sector, ultimately fostering economic stability.

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DESIGN THINKING AND PROBLEM SOLVING SKILLS AMONG STUDENTS USING THE MIND MAPPING TECHNIQUE- A CASE STUDY

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Abstract

The ultimate outcome of higher education is to make graduates ready to take over the future challenges and excel in their career. This career can either be working as employee (in private company / Government sector) or be a leader of self-start-up (entrepreneurship). Problem solving ability and critical thinking have undoubtedly remained the most essential skills expected from graduates by employers as well as investors / money lending agencies of a start-up. Problem solving ability goes beyond professional life, where it is needed even to manage and lead a happy personal life. The success celebration of any solution depends mainly on how the problem solvers have defined the problem. It is rightly said, 'A well-defined problem is half solution done'. Design Thinking is a method of solving problems addressing humans' needs and desires in a technologically feasible and strategically viable way. It focuses on achieving practical results and solutions in a multi-disciplinary way. This work describes the use of mind-mapping technique in defining effective problems, ultimately enhancing the problem-solving ability amongst learners with a focus on using Design Thinking approach of Problem-Solving.

Key words- Design Thinking, problem solving, mind-mapping

Introduction

The 21st century is about new challenges and problems which require a new set of skills. The world around us is evolving rapidly, and students in higher education need to learn essential skills such as critical reasoning, problem solving and critical thinking. Many studies have shown that students today need to develop these skills to solve key real-world problems. Because of the importance of these skills, many education institutes are trying to incorporate these skills into their curriculum. The role of teachers thus increases in finding the innovative methodologies to serve the purpose and facilitate students to acquire these skills.

Need for Developing Problem Solving Skill

In the past, students followed a mechanical progression in education. Every year posed new challenges and concepts for them as they undertook a standardized, one-size-fits-all curriculum and examinations. Education was concerned with getting the correct answer and scoring high grades, to reach the next level. There was little room for out of the box thinking that considered innovative solutions. The more information students could retain and regurgitate, the better equipped they were for an exam, ultimately translating to their real-life success. As a result, students were kept astray from practical skills and complex real-world problems they would eventually face after finishing their formative years in school and college. However, the 21st-century problems require both theoretical as well as practical knowledge. Students need to think out of the box to find suitable solutions to new and upcoming challenges. The 'National Education Policy – 2020' also aims at helping students develop problem-solving skills and make them more fit for future challenges and opportunities.

Concept of Problem- Solving

Problem-solving is a systematic process that involves critical reasoning and thinking to find a suitable solution to problems to achieve desired objectives. Following are the reasons why problem-solving is essential for school students:

o   It helps students distinguish between solvable issues and problems that cannot be solved.

o   It is necessary for preparing students to face complex multi-disciplinary and multi-variable problems.

o   Students who learn problem-solving skills often have a deeper understanding of causality.

o   When students solve complex problems individually or in a group, they become more resilient. They learn to look at problems from a new and different perspectives. Therefore, it makes them capable of taking more calculated risks.

o   Problem-solving is essential to a student's development because confident and productive students usually grow up as successful and confident employees as well as managers.

o   When students practice problem solving consistently, they can develop better social and situational awareness.

o   Employers always demand individuals who can work in a group and can jump out of their inherent thinking mode, especially since many of the challenges that the world faces today are unique and new.

The World Economic Forum has also recognized problem-solving skills as one of the ten essential 21st-century skills. A focus on problem-solving during the years of graduation helps students be more resourceful, confident, and think methodically. It enables students to find constructive and unique solutions to the problems of current times. Parents and teachers need to focus on these skills for their child's overall development.

Methodology of Problem Solving - Design Thinking for Creative Problem Solving

Out of the different methodologies adopted for problem solving, Design Thinking is an important and advanced one. Design thinking is a philosophy as well as a process aiming to find innovative solutions to the problems. Design thinking started out as a process for creating sleek new technology and products. But this methodology is now widely used across both the private and public sectors, for business and personal projects, all around the world. Design-thinking methodology was popularized by design consulting firm IDEO. The methods gained momentum in the larger business world after Tim Brown, the chief executive officer of IDEO, wrote an article in 2008 for the Harvard Business Review about the use of design thinking in business—including at a California hospital, a Japanese bicycle company, and the healthcare industry in India.

Design thinking is a process for solving problems by prioritizing the user's needs above all else. It relies on observing, with empathy, how people interact with their environments, and employs an iterative, hands-on approach to creating innovative solutions. Design thinking is "human-cantered," which means that it uses evidence of how consumers (humans) actually engage with a product or service, rather than how someone else or an organization thinks they will engage with it. To be truly human-cantered, designers watch how users use a product or service and continue to refine the product or service in order to improve the consumer's experience. This is the "iterative" part of design thinking. It favours moving quickly to get prototypes out to test, rather than endless research or rumination. In contrast to traditional problem-solving, which is a linear process of identifying a problem and then brainstorming solutions, design thinking only works if it is iterative. It is less of a means to get to a single solution, and more of a way to continuously evolve your thinking and respond to user-needs. Though there are different blends of design thinking methodologies, here, the basic methodology is explained:

Empathize   Define   Ideate   Prototype   Test
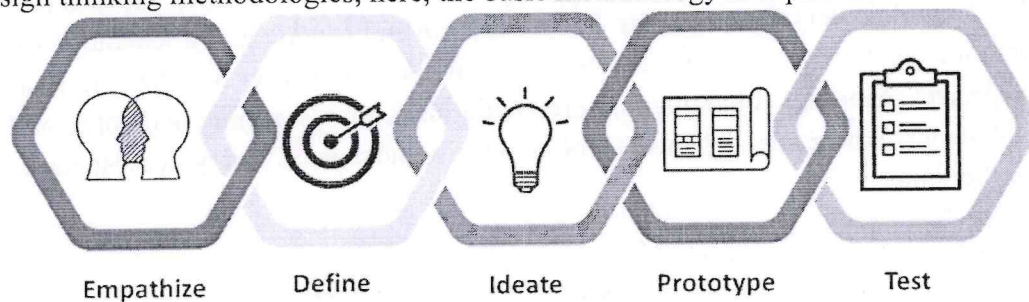
Fig.1 Stages in Design Thinking

Empathise – In this first step, a high understanding of users and their requirements is gathered by following empathising with users and conducting interviews of the users. A deep dive is taken into user-needs and their emotional insights associated with the problem. It generates a broad list of activities, requirements, challenges, emotions and so on.

Define –This stage comprises of analysing the complex (mixed) data received in earlier stage of empathising. It requires skills such as sorting the data, categorizing the data, data interpretation and interlinking the categories of data. As the saying goes, 'A well-defined problem is half solution done', this stage is the most critical stage in problem solving.

Ideate – This stage includes the ideation process for getting multiple solutions to the problem.

Here, all the possible ways of solving the problem are discussed and brainstormed and the most suitable or the solutions addressing maximum user-needs are finalized for next step. It applies use of the knowledge base, creativity, science and technology.

Prototype – The ideas which were shortlisted in earlier stage are further taken up for proto-typing wherein the models of these solution ideas are made out using sketches, flowcharts, wireframes, software, physical models from cheap materials, etc.

Test – After preparing prototypes, its time to validate the chosen solution ideas. Goals and evaluation criteria are set and observations/feedback about performance of the prototypes are noted down. Further, a comparative study of these results is done to optimize and find a final solution to the given problem.

Using Mind-Mapping Technique for Formulating Problems in Design Thinking (Define Stage of Design Thinking)

Einstein nailed the definition of problem solving. He said, "The formulation of the problem is often more essential than its solution, which may be merely a matter of mathematical or experimental skill." It is very clear that including the highest possible variations and extractions of data obtained prior to problem formulation, is very important in problem solving. Further, interpretation of the bulk data can be made easy by understanding interlinking of the categorized data. Thus, there is a need of some special effort to be put in problem formulation which shall include all the required aspects as well as it shall not confuse the ones into the process. Mind maps are a one-of-a-kind way to stay organized as well as an effective way of sharing detailed information. Mind maps are an excellent way to be creative while also connecting your findings.

Mind mapping is a great way to brainstorm, plan, or turn ideas into the steps needed to make it real. This technique was developed by Tony Buzan. Mind Mapping is a technique of visual representation to show relationship between various ideas, concepts or other information. It helps in project planning, collecting and organizing data, brainstorming and solve problems. The mind maps can be prepared by using colour pencils and papers. Today, we also have digital tools for the same.
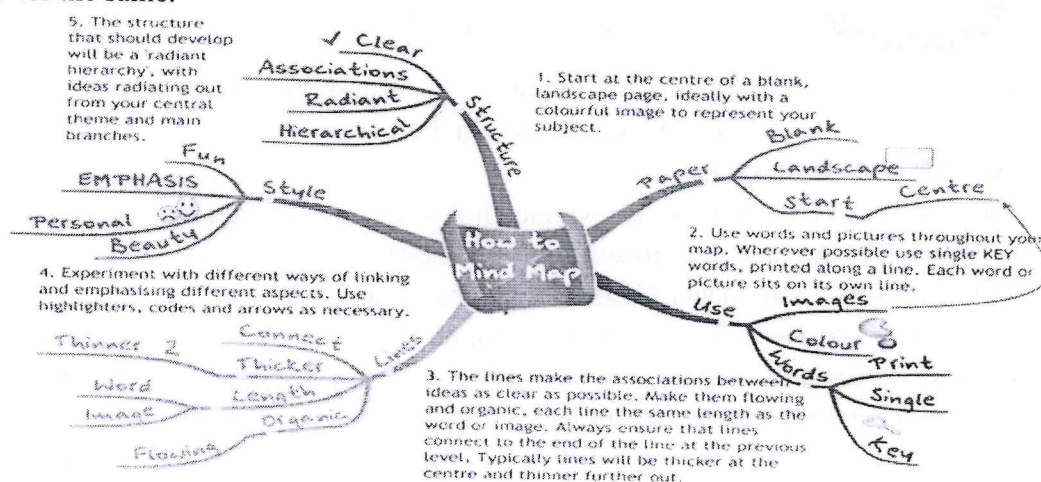
Fig.2 Mind-Mapping Process

Steps used in Mind-Mapping

o   All mind maps begin with a main concept or idea to which rest of the map revolves around, so choosing that idea or topic is the first step. Begin by creating an image or writing a word which represents that first main idea.

o   From that main idea, create branches (as many as needed), that each represent a single word that relates to the main topic. It's helpful to use different colours and images to differentiate the branches and sub-topics.

o   Then, create sub-branches that stem from the main branches to further expand on ideas and concepts. These sub-branches will also contain words that elaborate on the topic of the branch it stems from. This helps develop and elaborate on the overall theme of the mind map.

The best way to explain a how to mind map is by using the mind map itself (refer figure 2).

Case Study –Applying Mind-Mapping Technique to Formulate Problems from Empathy Data obtained for Persons with disability

A batch of students of Third Year (Bachelor of commerce –B COM Course) was assigned to formulate problems for the persons with disability as an assignment work for the subject of 'Creativity and Inovation'. They were expected to follow the initial step of design thinking i.e. Empathising with the users as explained above. They had to collect empathy data by:

1.   assuming themselves as persons with disability
2.   gathering observation data from their peers
3.   conducting interviews of the real persons with disability

Further they had to list out all the activities of the concerned people, put up the variation cases in these listed activities and finally find out the pain points leading to possible problem statements.

The students completed the task and had brought the information. It was observed that they were not in a position to summarize the information and come up with the concluding remarks. They were overwhelmed by the amount of data and variety of data they obtained. Some of the students were confused and were not in a position to finalise the problem statements.

Further these students were trained to develop mind-maps as discussed earlier and asked to apply the mind-mapping technique to the empathy data of the persons with disability. It was observed that, the process of developing mind map based on the information they collected, facilitated them to categorize the data, set-up correlations and present the summarized form of information in an effective and easily understandable way. The simple mind-map as shown below was developed in a brainstorming session. Further, the map was taken up for next brainstorming session that led to the formulation of the problem statements. The same is also represented in figure.3 below. A significant shift in the problem-solving approach of students was observed and the activity gave a boost to these students as they could overcome the feeling of overwhelming and confusion with the help of mind- mapping technique.
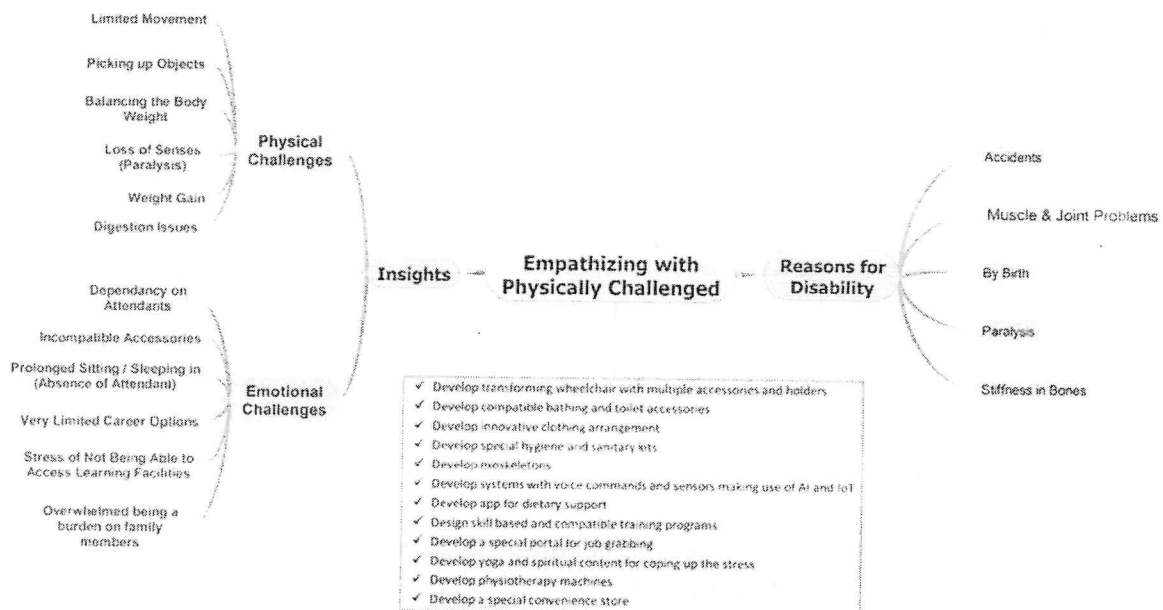
Fig.3 Mind-Mapping of Empathy Data Obtained from Persons with disability

Conclusion

The following conclusions are drawn at the end of this work:

1.   Problem Solving skill is an essential skill to be imparted to students in a view to comply with the National Education Policy – 2020 and prepare students for future challenges and opportunities.

2.   Use of Design thinking approach focuses on the formulating an all-inclusive problem due to inclusion of high-level empathising with the user before defining the problems to solve.

3.   Mind-mapping is an effective tool to organise and present information for brainstorming and likewise ideation sessions.

4.   Use of mind-mapping facilitates organising empathy data, establishing co-relations between various data categories related to user and thus helping students to formulate problems effectively.

5.   This way of blending the methodologies, encouraged students and helped them to overcome confusions and overwhelming caused due to random data received.

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Review Article on IoT & Sensor Technology Across Different Sectors

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Abstract:

By enabling continuous connectivity between tangible entities and the digital realm, the Internet of Things (IoT) has caused a paradigm shift in our interactions with the environment. Sensors, which serve as the sensory organs of Internet of Things (IoT) systems, are central to this revolutionary technology, amassing significant data from their surroundings. This review article looks at the wide range of sensors used in Internet of Things (IoT) applications and the various domains in which they are used.

The first section of the evaluation provides a comprehensive overview of the Internet of Things (IoT) and its significance in today's interconnected world. The text emphasises the critical importance of sensors in enabling IoT ecosystems and identifies the fundamental characteristics that make sensors indispensable for data acquisition.

The sections that follow provide an in-depth examination of sensor taxonomy, which categorises sensors based on their functionalities and operational principles. Environmental sensors, biometric sensors, proximity sensors, image and video sensors, and other sensor types are covered. Each sensor category is thoroughly examined, providing insights into their respective underlying technologies and the unique data that they can capture.

Furthermore, the article delves into the various applications of these sensors in various fields. The use of sensors in various sectors, such as smart cities, healthcare, agriculture, industrial automation, and others, is demonstrated through case studies and examples. The article emphasises the importance of sensor data in developing practical insights and improving decision-making quality in these fields.

In addition, the article discusses emerging trends and challenges in the field of IoT sensors. This highlights the importance of addressing issues such as power efficiency, sensor interoperability, and data security in order to ensure the continued growth and prosperity of Internet of Things applications.

This review concludes with a thorough examination of the applications and utilisation of various sensors in the Internet of Things. This statement emphasises the critical role of sensors in influencing the Internet of Things (IoT) environment and demonstrates their ability to affect significant changes in a variety of industries. Sensors will continue to play a critical role in the Internet of Things, enabling new opportunities and propelling advancements in a globally interconnected society.

Key Words:

Internet of Things (IoT), Sensors, Applications, AI in IoT

Introduction

The Internet of Things (IoT) is a game-changing technological paradigm that has transformed how we interact with the digital world by connecting physical devices and allowing them to communicate and share data seamlessly over the internet. In essence, IoT extends the power of the internet beyond traditional computing devices to a wide range of everyday objects, resulting in a network of interconnected devices capable of collecting, exchanging, and acting on data in real time. The evolution of IoT has been an enthralling journey marked by technological advances, widespread adoption, and the promise of reshaping industries and improving various aspects of our daily lives.

IoT has its origins in the early 1980s, when the concept of "embedded internet" first emerged. However, the term "Internet of Things" did not become popular until the late 1990s and early 2000s. Kevin Ashton, a British technology pioneer, is widely credited with coining the term while working at Procter & Gamble in 1999. Ashton imagined a future in which everyday objects would be outfitted with sensors and linked to the internet, forming a network in which data would flow seamlessly between devices. This was the conceptual start of IoT.

The evolution of IoT can be divided into several key stages, each marked by significant technological advancements and shifts in IoT solution adoption. The initial conceptualization and experimentation with basic connected devices occurred during the first phase, known as IoT 1.0. This phase laid the groundwork for RFID (Radio-Frequency Identification) technology and early sensor networks. However, during this time, widespread adoption was hampered by limited processing power, high costs, and a lack of standardised protocols.

The subsequent phase, IoT 2.0, saw significant advances in communication protocols, sensor miniaturisation, and improved connectivity. The introduction of IPv6 was critical in providing a virtually infinite number of IP addresses, addressing one of the limitations of the previous phase. Furthermore, the advancement of low-power wireless technologies such as Zigbee and Z-Wave has aided in the proliferation of IoT devices in a variety of domains such as smart homes, healthcare, and industrial applications.

As the decade progressed, the third phase of IoT evolution, dubbed IoT 3.0, saw the convergence of technologies such as cloud computing, big data analytics, and artificial intelligence (AI). These technological synergies enabled IoT devices to collect data as well as process and analyse it locally or in the cloud, extracting meaningful insights. The incorporation of machine learning algorithms enabled IoT systems to adapt and learn from the data they generated, thereby improving efficiency and predictive capabilities.

During this phase, security concerns became more prominent as the increasing number of interconnected devices created a larger attack surface for malicious actors. As a result, there has been an increased emphasis on implementing robust security measures, such as encryption, authentication, and secure device management, to protect IoT ecosystems.

The introduction of 5G technology in the late 2010s hastened the evolution of IoT by enabling faster and more reliable connectivity. The low latency and high bandwidth capabilities of 5G opened up new possibilities for real-time data transmission applications such as autonomous vehicles and augmented reality. The integration of 5G and IoT was a significant step forward in enabling large-scale deployment of connected devices and supporting advanced use cases across multiple industries.

IoT continues to evolve in the current landscape, with a focus on addressing remaining challenges and expanding its reach into new frontiers. Edge computing has gained popularity because it involves processing data closer to the source rather than relying solely on centralised cloud servers. This method reduces latency, improves data privacy, and allows for more efficient use of network resources. Edge computing is especially important for applications that require real-time processing, such as industrial automation and critical healthcare systems.

Furthermore, standardisation efforts are underway, led by organisations such as the Industrial Internet Consortium (IIC) and the International Electrotechnical Commission (IEC), with the goal of developing common frameworks and interoperability standards for IoT devices. Standardization is critical for ensuring seamless communication among disparate devices and for fostering a more cohesive IoT ecosystem.

As the Internet of Things matures, its impact on various industries grows more pronounced. IoT is revolutionising precision farming in agriculture by providing farmers with real-time data on soil conditions, weather patterns, and crop health. IoT devices in healthcare are improving patient monitoring, enabling remote diagnostics, and increasing the overall efficiency of healthcare systems. Smart cities use IoT to improve resource management, public safety, and the quality of urban living.

Despite the remarkable progress, there are still challenges, such as privacy concerns, data security, and the need for sustainable and energy-efficient IoT devices. Addressing these challenges while exploring new avenues for innovation and integration with emerging technologies such as blockchain and quantum computing is part of the ongoing evolution of IoT.

To summarise, the Internet of Things has evolved through distinct phases marked by technological breakthroughs and increased adoption since its inception. From its inception to the current era of 5G connectivity and edge computing, IoT has demonstrated its ability to reshape industries and improve our daily lives. Moving forward, continued collaboration among industry stakeholders, ongoing standardisation efforts, and advancements in security and sustainability will be critical in shaping the future trajectory of IoT.

Applications Across Diverse Sectors

The Internet of Things (IoT) has seen widespread adoption across multiple industries, transforming the way industries operate, increasing efficiency, and providing value to end users. The evolution of IoT has been critical in expanding its applications, making it a critical component in industries ranging from healthcare to agriculture, manufacturing to transportation, and beyond.

IoT has emerged as a revolutionary force in the healthcare sector, enabling the development of smart healthcare systems. Wearable fitness trackers, remote patient monitoring systems, and smart medical devices are examples of IoT devices that enable continuous health monitoring and real-time data collection. Not only does this improve patient care, but it also enables healthcare providers to make informed decisions based on personalised patient data. Wearable IoT devices, for example, can monitor vital signs, activity levels, and even deliver medication reminders, promoting preventive healthcare and remote patient management (Marsal-Llacuna et al., 2013).

Precision farming has emerged as a result of IoT in agriculture, ushering in a new era of smart agriculture. Farmers can use IoT devices such as soil sensors, drones, and autonomous machinery to more efficiently monitor and manage crop conditions, irrigation, and fertilisation. This data-driven approach optimises resource utilisation, increases crop yields, and lowers environmental impact (Atzori et al., 2010).

With the integration of IoT technologies, the manufacturing sector has undergone significant transformation. This paradigm shift, known as Industry 4.0, involves the use of IoT devices and connectivity to create "smart factories." Sensors embedded in manufacturing equipment collect real-time data, enabling predictive maintenance, process optimization, and overall efficiency improvements. As a result, the manufacturing environment has become more agile and responsive, allowing it to meet the demands of a rapidly changing market (Lee et al., 2015).

Another area where IoT is having a significant impact is transportation. Smart transportation systems have emerged as a result of the evolution of IoT, with applications ranging from connected vehicles to intelligent traffic management.

In-vehicle IoT sensors collect data on traffic conditions, vehicle performance, and driver behaviour, allowing for safer and more efficient transportation. In addition, logistics firms use IoT to track the location and condition of shipments in real time, improving supply chain visibility and management (Hancke et al., 2012).

The energy sector has also embraced IoT to optimise energy consumption, improve grid management, and boost overall energy system efficiency. Smart metres with IoT technology allow for real-time monitoring of energy consumption in homes and businesses. This information can be used to implement demand-response strategies, reduce energy waste, and improve energy grid reliability (Gubbi et al., 2013).

In the context of smart cities, IoT plays a critical role in creating urban environments that are more sustainable, efficient, and responsive to residents' needs. Intelligent traffic management, waste management systems, environmental monitoring, and smart street lighting are examples of smart city applications. These IoT-powered solutions help to optimise resources, reduce pollution, and improve the quality of life for city dwellers (Zanella et al., 2014).

With the integration of IoT, the retail industry has also undergone a transformation. IoT devices such as RFID tags, beacons, and smart shelves are used by retailers to improve inventory management, personalise the shopping experience, and optimise supply chain operations. RFID technology, for example, enables real-time product tracking throughout the supply chain, reducing errors and improving inventory accuracy (Bandyopadhyay & Sen, 2011).

IoT devices have become commonplace in home automation, providing homeowners with increased convenience, security, and energy efficiency. Smartphones can control smart thermostats, lighting systems, and security cameras, giving users more control over their home environment. In this sector, the evolution of IoT has resulted in the development of interconnected ecosystems that seamlessly integrate various smart devices for a more cohesive and user-friendly experience (Atzori et al., 2010).

The evolution of IoT has also benefited the security and surveillance sectors. IoT-enabled smart surveillance cameras can provide real-time monitoring, facial recognition, and automated threat detection. Integrating IoT into security systems improves situational awareness and response capabilities, increasing the security of public spaces and critical infrastructure (Al-Fuqaha et al., 2015).

As IoT evolves, its applications are likely to expand even further, with new industries looking for ways to capitalise on the transformative power of connected devices. These opportunities, however, bring with them challenges related to data security, privacy concerns, and the need for standardised protocols to ensure interoperability across diverse IoT ecosystems.

Finally, the evolution of IoT has accelerated its integration into various sectors, influencing how industries operate and deliver services. From healthcare to agriculture, manufacturing to transportation, the pervasiveness of IoT applications demonstrates the technology's versatility and transformative potential. As technology advances, the scope of IoT is expected to expand, affecting more sectors and contributing to the creation of a more connected and intelligent world.

IoT Sensors in Healthcare: Enhancing Patient Monitoring and Well-being

The use of Internet of Things (IoT) sensors in healthcare has heralded a new era of patient monitoring and personalised care. These real-time data-capture sensors provide healthcare providers with valuable insights into patients' health conditions, improve diagnostic accuracy, and improve overall healthcare delivery. In healthcare settings, various types of IoT sensors have been deployed, each serving a specific purpose to address the diverse needs of patients and healthcare professionals.

Continuous vital sign monitoring is one of the most common applications of IoT sensors in healthcare. Wearable sensors, such as accelerometers and photoplethysmography (PPG) sensors, allow for continuous monitoring of vital signs such as heart rate, blood pressure, and oxygen saturation. These devices provide a non-intrusive, real-time method of tracking patients' physiological parameters, allowing for early detection of abnormalities and prompt intervention (Wang et al., 2018).

Blood glucose monitoring is another important aspect of healthcare, particularly for diabetics. When compared to traditional intermittent methods, IoT sensors in the form of continuous glucose monitoring (CGM) devices provide a more comprehensive and real-time view of blood glucose levels. CGM devices use sensors implanted beneath the skin to continuously measure glucose levels, providing useful data for diabetes management and reducing the need for frequent fingerstick tests (Zhang et al., 2020).

IoT sensors are also important in medication adherence and management. Sensor-equipped smart pill bottles and medication dispensers can track when patients take their medications. These sensors transmit medication adherence data to healthcare providers, allowing them to intervene if patients miss doses or have irregular medication patterns. This technology improves medication adherence, lowers the risk of adverse events, and improves patient outcomes, especially in patients with chronic conditions (Chai et al., 2018).

IoT sensors provide solutions for remote respiratory monitoring for patients with respiratory conditions such as asthma or chronic obstructive pulmonary disease (COPD). Sensors in smart inhalers can record the time and frequency of inhaler use, providing insights into patients' adherence to prescribed inhalation therapies. These sensors can also measure lung function and environmental factors, allowing healthcare providers to tailor treatment plans to individual needs (Bokolo, 2020).

IoT sensors also aid in the detection and prevention of falls in healthcare settings, particularly among the elderly. Wearable devices and ambient sensors installed in living spaces can track movement patterns and detect anomalies that could indicate a fall. These sensors can send alerts to caregivers or emergency services in the event of a fall, ensuring a quick response and lowering the risk of injuries (Hsieh et al., 2019).

IoT sensors have been used in neonatal care to monitor premature infants in neonatal intensive care units (NICUs). Vital signs such as heart rate, respiratory rate, and body temperature can be measured using sensors attached to a baby's skin.

These sensors provide continuous data to healthcare professionals, allowing for timely interventions and personalised care for fragile newborns (Lavasani et al., 2020).

Another notable application of IoT technology is the installation of environmental sensors in healthcare facilities. These sensors monitor variables such as temperature, humidity, and air quality to ensure patient comfort and safety. Furthermore, environmental sensors play an important role in infection control by detecting and alerting healthcare personnel to potential environmental hazards (Fernandez-Llatas et al., 2018).

The advancement of IoT sensors in healthcare has not only improved patient monitoring but also aided in the transition to telehealth and remote patient care. Patients can receive healthcare services from the comfort of their own homes thanks to remote monitoring solutions enabled by IoT sensors. This is especially beneficial for people with chronic conditions, as it reduces the need for frequent hospital visits while also improving overall patient satisfaction (Kitsiou et al., 2020).

Despite the numerous benefits of IoT sensors in healthcare, challenges such as data security, interoperability, and standardisation must be addressed in order for these technologies to be widely and effectively adopted. Furthermore, ethical concerns about data privacy and patient consent are critical to establishing trust in IoT-enabled healthcare solutions (Kumaravel et al., 2020).

Finally, IoT sensors have emerged as powerful tools in the healthcare sector, with a wide range of applications to improve patient monitoring, diagnostics, and personalised care. These sensors contribute to the shift toward more proactive and patient-centric healthcare, from continuous vital sign monitoring to medication adherence and fall detection. As technology advances, IoT sensor integration is expected to play an increasingly important role in shaping the future of healthcare delivery.

IoT Sensors in Agriculture: Enhancing Precision and Efficiency

The use of Internet of Things (IoT) sensors in agriculture has transformed traditional farming practises, ushering in a new era of precision farming. These real-time data collection and transmission sensors provide farmers with valuable insights into crop health, soil conditions, and environmental parameters. The diverse array of IoT sensors in agriculture, ranging from soil moisture sensors to drone-based imaging systems, has significantly improved efficiency, resource management, and overall crop yield.

Soil monitoring is one of the key areas where IoT sensors have had a significant impact. Soil moisture sensors, for example, provide real-time information about soil moisture levels. This information enables farmers to optimise irrigation practises, ensuring that crops receive the correct amount of water, reducing water waste, and reducing the risk of over-irrigation, which can lead to soil erosion and nutrient leaching (López et al., 2019). Furthermore, soil temperature sensors help to improve understanding of the thermal conditions of the soil, influencing decisions about planting times and crop selection (Gong et al., 2016).

IoT-enabled weather stations are critical in providing agricultural areas with accurate and localised weather data. Temperature, humidity, wind speed, and precipitation, among other parameters, are collected by these stations. The integration of such weather data with other agricultural data sets enables farmers to make informed planting, harvesting, and pest management decisions. Access to weather information on a timely basis aids in mitigating the impact of adverse weather conditions and optimising agricultural practises for better crop outcomes (López et al., 2019).

Precision agriculture has benefited from the use of drones equipped with imaging sensors. Remote sensing technologies, such as multispectral and hyperspectral imaging, enable detailed crop health monitoring. These sensors are capable of detecting changes in plant health, identifying nutrient deficiencies, and even forecasting potential disease outbreaks. Drone-based sensors allow for large-scale and high-resolution data collection, providing farmers with actionable insights to improve crop management practises (Sugiura et al., 2019).

Smart cameras and computer vision technology used by IoT sensors also contribute to crop monitoring. Smart cameras can capture images of crops at different stages of development, which computer vision algorithms can then analyse to assess crop health, estimate yield, and detect anomalies. This real-time monitoring allows farmers to detect issues such as pest infestations or nutrient deficiencies early, allowing them to implement targeted interventions (Matese et al., 2015).

Another important application of IoT sensors in agriculture is livestock health monitoring. Wearable sensors can monitor livestock vital signs and behaviour, providing insights into their health and well-being. Smart collars for cattle, for example, can monitor body temperature, activity levels, and eating habits, allowing farmers to detect signs of illness or stress. This proactive approach to livestock management improves both animal welfare and farm productivity (Hernández-Ivarez et al., 2017).

The integration of various IoT sensors into a comprehensive farm management system, in addition to monitoring individual parameters, provides a holistic approach to precision agriculture. These integrated systems, also known as farm management information systems (FMIS), collect and analyse data from various sources, providing farmers with a centralised decision-making platform. Data from soil sensors, weather stations, drone imaging, and other IoT devices can be included in FMIS, providing a comprehensive view of farm conditions and facilitating data-driven decision-making (Zhang et al., 2020).

While the use of IoT sensors in agriculture has provided numerous benefits, challenges remain, particularly in data management and cybersecurity. Because of the massive amount of data generated by these sensors, robust storage and processing capabilities are required. Furthermore, it is critical to ensure the security and privacy of sensitive agricultural data. Secure communication protocols and data encryption are critical safeguards against unauthorised access and data breaches (López et al., 2019).

Finally, the incorporation of IoT sensors in agriculture has ushered in a new era of precision farming, giving farmers unprecedented insight into the conditions of their crops, soil, and livestock.

From soil moisture sensors that improve irrigation practises to drone-based imaging systems that revolutionise crop monitoring, the diverse array of IoT sensors has significantly improved agricultural efficiency and sustainability. The potential for IoT in agriculture to further optimise resource management and increase crop yields is poised for continued growth as technology advances and challenges are addressed.

IoT Sensors Transforming Manufacturing: Increasing Productivity and Efficiency

The incorporation of Internet of Things (IoT) sensors into the manufacturing sector has heralded a new era of smart manufacturing known colloquially as Industry 4.0. These sensors, strategically placed throughout the manufacturing process, provide real-time data, allowing manufacturers to optimise operations, improve quality control, and increase overall efficiency. In the manufacturing environment, a variety of IoT sensors are used, each serving a specific purpose to streamline processes and facilitate data-driven decision-making.

RFID (Radio-Frequency Identification) Sensors: RFID sensors are widely used in the manufacturing industry for inventory tracking and management. Radio frequency signals are used by these sensors to identify and track individual items or products as they move through the manufacturing process. RFID technology enables manufacturers to optimise supply chain management and reduce errors by providing real-time visibility into the location and status of raw materials, work-in-process, and finished goods (Monostori et al., 2016).

Sensors for Machine Condition Monitoring: IoT sensors are integrated into machinery to monitor its condition in real time. Machine condition monitoring devices include vibration sensors, temperature sensors, and acoustic sensors. Manufacturers can implement predictive maintenance strategies, reducing downtime and preventing costly unplanned breakdowns, by continuously assessing the health of their equipment (Jantunen, 2014).

Cameras and vision sensors: Vision sensors and cameras are critical components of quality control and inspection processes on the factory floor. These sensors take pictures or videos of products, enabling automated visual inspections. Data is analysed by computer vision algorithms, which identify defects or deviations from quality standards. This ensures product consistency and reduces the need for manual inspections (Tao et al., 2018).

Temperature and Humidity Sensors: Maintaining optimal environmental conditions in manufacturing is critical, particularly in industries such as pharmaceuticals and food processing. IoT sensors that measure temperature and humidity aid in ensuring that manufacturing environments meet regulatory and product specifications. These sensors help to improve overall product quality and safety (Shen et al., 2019).

Pressure Sensors: Pressure sensors are used in manufacturing processes that require precise pressure control. These sensors monitor and regulate pressure levels in everything from moulding processes to hydraulic systems, ensuring that manufacturing processes are carried out accurately and efficiently. Data from pressure sensors can also be analysed to identify potential problems before they cause defects or failures (Borghi et al., 2016).

Proximity sensors are used in manufacturing for a variety of purposes, including object detection and automation. These sensors detect the presence or absence of objects, allowing machines to operate only when necessary. Proximity sensors, for example, contribute to energy efficiency in conveyor systems by activating or deactivating conveyors based on the proximity of items (Roumeliotis et al., 2019).

Sensors for IoT-Enabled Robotics: In the age of smart manufacturing, robotics is critical for automating repetitive tasks. Robots with IoT-enabled sensors provide real-time data on their movements, status, and performance. This data is critical for optimising robot operations, ensuring safety in collaborative environments, and allowing for seamless integration with other manufacturing processes (Ferreira et al., 2018).

GPS Asset Tracking Sensors: GPS sensors are used for asset tracking in large manufacturing facilities with large outdoor areas. These sensors aid in the tracking of vehicles, raw materials, and finished goods within the manufacturing facility. GPS data aids in logistics management and overall process optimization (De Pace et al., 2017).

The adoption of these various IoT sensors in the manufacturing sector is motivated by the overarching goal of increasing efficiency, lowering costs, and improving overall productivity. These sensors' data serve as the foundation for advanced analytics, machine learning, and artificial intelligence applications, allowing manufacturers to make data-driven decisions and optimise their operations in real time (Ferreira et al., 2018).

The advantages of IoT sensors in manufacturing go beyond operational efficiency. They help to create a more agile and responsive manufacturing environment that can adapt to changing market demands. Furthermore, the data collected by these sensors can be used to improve processes continuously, resulting in higher-quality products and increased customer satisfaction (Monostori et al., 2016).

Despite the obvious benefits, the use of IoT sensors in manufacturing is not without challenges. Manufacturers face challenges such as interoperability issues, cybersecurity concerns, and the complexity of integrating diverse sensors into existing systems. In order to address these challenges and ensure the seamless integration of IoT sensors into the manufacturing landscape, standardisation efforts and ongoing technological advancements are critical (Ferreira et al., 2018).

Finally, the incorporation of IoT sensors in the manufacturing sector represents a paradigm shift toward smart manufacturing. These devices, which range from RFID sensors for inventory management to vision sensors for quality control, play a critical role in optimising processes, improving product quality, and increasing overall efficiency. As technology advances, the role of IoT sensors in manufacturing will expand, shaping the future of industrial production.

IoT Sensors Revolutionizing Transportation: Enhancing Safety and Efficiency

The incorporation of Internet of Things (IoT) sensors in the transportation sector has heralded a new era of intelligent and connected mobility. These sensors, which are installed in various modes of transportation, provide real-time data that improves safety, optimises operations, and overall efficiency. A diverse array of IoT sensors, from vehicles to infrastructure, contributes to the transformation of traditional transportation systems into intelligent and responsive ecosystems.

1. GPS receivers: GPS (Global Positioning System) sensors are critical to IoT applications in transportation. These sensors provide vehicles with real-time location data, allowing for precise tracking and navigation. GPS sensors are used in logistics and fleet management to optimise route planning, monitor vehicle movements, and improve overall fleet efficiency. GPS sensors also help with location-based services like ride-sharing and dynamic routing (Lei et al., 2017).

2. Vehicle Health Monitoring Sensors: Internet of Things (IoT) sensors embedded in vehicles monitor a variety of parameters related to their health and performance. These sensors can monitor engine diagnostics, fuel efficiency, tyre pressure, and other important parameters. By providing real-time insights into vehicle condition, manufacturers and fleet operators can implement predictive maintenance strategies, reducing breakdowns and improving overall transportation fleet reliability (Huang et al., 2017).

3. Traffic Flow Sensors: IoT sensors, such as inductive loop sensors and cameras, are used to monitor traffic flow and congestion in road infrastructure. These sensors gather information about vehicle density, speed, and traffic patterns. Using this data, transportation agencies can implement dynamic traffic management strategies, optimise traffic signal timings, and provide real-time traffic updates to drivers, all of which contribute to reduced congestion and improved overall traffic flow (Zheng et al., 2014).

4. Collision Avoidance Sensors: Collision avoidance sensors, such as radar and lidar, are essential for improving vehicle safety. These sensors are built into vehicles to detect obstacles, pedestrians, and other vehicles. Collision avoidance sensors aid in the development of advanced driver assistance systems (ADAS), enabling features such as automatic emergency braking and adaptive cruise control in the context of self-driving vehicles (Kianfar et al., 2019).

5. Smart Parking Sensors: Internet of Things (IoT) sensors are installed in parking lots to provide real-time information about parking availability. These sensors can detect whether or not a parking space is occupied and transmit this information to drivers via mobile applications. Smart parking solutions help to reduce traffic congestion by allowing drivers to quickly locate available parking spaces, reducing the amount of time spent looking for parking (Zhang et al., 2015).

6. IoT Sensors in Public Transportation: IoT sensors are used in public transportation systems to improve service efficiency and the passenger experience. Sensors on buses and trains can track vehicle occupancy, allowing for real-time passenger load tracking.

Sensors at transportation hubs also provide data on crowd density, which aids authorities in managing passenger flow and optimising public transportation schedules (Wang et al., 2016).

7. Environmental Monitoring Sensors: IoT sensors contribute to transportation environmental sustainability by monitoring air quality and emissions. These sensors, which can be installed along roadways to measure pollutants and provide real-time data on air quality, can be installed. This data is useful for implementing pollution control measures, assessing the environmental impact of transportation activities, and advocating for sustainable urban mobility (Ding et al., 2016).

Biometric Driver Monitoring Sensors: To monitor driver behaviour, biometric sensors such as facial recognition and heart rate monitors are integrated into vehicles. These sensors can detect fatigue, distraction, or impairment and alert the driver or autonomous control systems. Biometric sensors help to reduce the risk of accidents and improve overall road safety by improving driver safety (Alam et al., 2020).

The goal of integrating these various IoT sensors in transportation is to create intelligent, connected, and safer mobility systems. These sensors' data enable not only real-time monitoring and decision-making, but also the development of future transportation technologies such as autonomous vehicles and smart infrastructure (Lei et al., 2017).

The implementation of IoT sensors in transportation faces challenges such as data privacy, security, and the need for standardised communication protocols. Addressing these challenges is critical to ensuring the reliability and trustworthiness of IoT-enabled transportation systems as vehicles and infrastructure become increasingly connected (Wang et al., 2016).

Finally, the incorporation of IoT sensors in the transportation sector is reshaping how we move and interact with our mobility systems. These devices, which range from GPS sensors for navigation to collision avoidance sensors for safety, play a critical role in creating more efficient, safer, and sustainable transportation ecosystems. The impact of IoT sensors in transportation is expected to grow as technology advances, contributing to the realisation of smart and connected mobility.

IoT Sensors Revolutionizing the Retail Industry: Enhancing Customer Experience and Operational Efficiency

The use of Internet of Things (IoT) sensors in retail is changing the landscape of customer engagement, inventory management, and overall operational efficiency. These sensors, strategically placed throughout retail spaces, provide real-time data to retailers, allowing them to better understand customer behaviour, optimise supply chain processes, and create personalised shopping experiences. A diverse array of IoT sensors, from smart shelves to customer tracking, is helping to transform traditional retail into a more connected and data-driven environment.

1. RFID (Radio-Frequency Identification) Sensors: RFID sensors are an essential component of IoT applications in the retail industry, particularly inventory management. These sensors track and manage inventory in real time by using radio frequency signals.

Retailers can track product movement, automate stock replenishment, and reduce out-of-stock situations. RFID technology improves supply chain visibility, streamlines logistics, and ultimately improves inventory management efficiency (Zhang et al., 2016).

2. Smart Shelf Sensors: IoT-enabled smart shelves are becoming increasingly common in retail environments. These sensors can detect product movement, track inventory levels, and provide retailers with real-time updates. Smart shelf sensors, when combined with data analytics, enable retailers to optimise shelf layouts, ensure product availability, and improve the overall in-store shopping experience for customers (Perera et al., 2017).

3. Customer Tracking Sensors: IoT sensors such as beacons and video analytics are used to track customers in retail environments. Foot traffic, dwell times, and customer movement patterns can all be tracked using these sensors. Retailers use this information to better understand customer behaviour, optimise store layouts, and deliver personalised promotions or recommendations via mobile apps. Customer tracking sensors help to create a more personalised and engaging shopping experience (Ngai et al., 2019).

4. Temperature and Humidity Sensors: Temperature and humidity sensors are critical in the retail industry, particularly in the grocery and pharmaceutical sectors, for maintaining product quality. These sensors monitor environmental conditions in order to keep perishable goods at optimal temperatures, reducing spoilage and waste. Fresh produce and medicines, for example, benefit from the precision provided by IoT sensors in maintaining quality throughout the supply chain (Hofmann et al., 2019).

5. In-Store Navigation Sensors: IoT sensors, in conjunction with mobile applications, assist customers with in-store navigation. For example, beacon technology can provide location-based services within the store, directing customers to specific products, promotions, or departments. In-store navigation sensors improve overall customer satisfaction and loyalty by providing a seamless and personalised shopping journey (Froiz-Mguez et al., 2019).

6. Electronic Shelf Label (ESL) Sensors: Electronic Shelf Label (ESL) sensors are used to create dynamic and digital pricing displays on retail shelves. These sensors can be real-time updated to reflect price changes, promotions, or inventory status. ESL sensors improve pricing management by eliminating the need for manual label updates and giving retailers more flexibility in adjusting prices based on demand or other factors (Velasco et al., 2019).

7. Checkout and Payment Sensors: IoT sensors help to improve retail checkout and payment processes. Sensor-enabled contactless payment systems provide customers with a convenient and secure payment experience. Furthermore, smart checkout systems with sensors can automate the payment process, reducing wait times and increasing overall point-of-sale efficiency (Perera et al., 2017).

8. Retail Security and Loss Prevention Sensors: IoT sensors help with retail security and loss prevention. Video analytics-enabled surveillance cameras can detect suspicious behaviour, monitor store entrances and exits, and reduce theft. RFID sensors can be used for anti-shoplifting purposes as well as inventory management by triggering alarms when products leave the store without proper authorization (Ngai et al., 2019).

The integration of these various IoT sensors in the retail industry is motivated by the common goal of creating more efficient, customer-centric, and data-driven retail experiences. These sensors' data enable retailers to make informed decisions, streamline operations, and adapt to changing consumer preferences (Froiz-Mguez et al., 2019).

Concerns about data privacy, security, and the need for standardised communication protocols are among the challenges in implementing IoT sensors in retail. Addressing these issues is critical to establishing consumer trust and ensuring the seamless integration of IoT-enabled solutions in the retail environment (Velasco et al., 2019).

Finally, IoT sensor integration in the retail industry is transforming traditional shopping experiences into more connected, personalised, and efficient journeys. These sensors play an important role in creating a more data-driven and responsive retail ecosystem, from inventory management to customer tracking and in-store navigation. The impact of IoT sensors in retail is expected to grow as technology advances, contributing to the evolution of a more innovative and customer-centric retail landscape.

The Future Confluence: Evolution of IoT Sensors with AI and ML Integration

The Internet of Things (IoT) has evolved with a constant push toward increased connectivity, intelligence, and efficiency. In the future, the incorporation of Artificial Intelligence (AI) and Machine Learning (ML) into IoT sensor systems will be a transformative force, unlocking unprecedented capabilities and applications across multiple domains. This convergence has the potential to not only improve the functionality of IoT sensors, but also to enable them to learn, adapt, and make intelligent decisions in real time.

1. Using AI and machine learning to improve sensor intelligence: The incorporation of AI and ML technologies into IoT sensors is a logical step toward developing smarter, more autonomous systems. Traditional IoT sensors generate massive amounts of data, and AI and ML algorithms can be used to make more sophisticated sense of this data. By incorporating intelligence into sensors, they can analyse patterns, detect anomalies, and derive actionable insights without relying on centralised processing. This reduces the need for continuous human intervention while also allowing for more timely and context-aware decision-making.

2. Real-Time Analytics and Predictive Capabilities: AI and machine learning algorithms enable IoT sensors to go beyond data collection and into real-time analytics and predictive capabilities. Sensors can predict future events by learning from historical data patterns. In the manufacturing industry, for example, AI-enabled sensors can predict equipment failures, allowing for proactive maintenance and minimising downtime. Predictive analytics in retail can predict customer preferences, allowing for personalised recommendations and improving the overall shopping experience. When IoT sensors are combined with AI and ML, a paradigm shift from reactive to proactive systems occurs.

3. Increased Energy Efficiency and Sustainability: The combination of AI, ML, and IoT sensors has the potential to significantly improve energy efficiency and promote sustainability. Smart buildings with AI-powered sensors can optimise energy consumption based on real-time occupancy patterns, weather conditions, and usage data.

AI-integrated sensors in agriculture can analyse environmental factors and optimise irrigation, reducing water waste. The collaboration of these technologies contributes to the development of more environmentally conscious and resource-efficient systems.

4. Edge Computing and Decentralized Processing: The integration of AI and ML with IoT sensors enables edge computing, allowing data processing to take place closer to the source rather than relying solely on centralised cloud servers. This decentralised processing capability is especially useful in scenarios requiring real-time decision-making, such as autonomous vehicles or industrial automation. Latency is reduced and the overall system becomes more responsive and agile by deploying AI models directly on IoT devices or at the network's edge.

5. Security and Anomaly Detection: As the scale and complexity of IoT deployments grow, security becomes increasingly important. AI and machine learning are critical in improving the security of IoT sensor networks. These technologies can analyse normal behaviour patterns and detect anomalies that could indicate security threats. In terms of cybersecurity, AI-powered sensors can adapt and learn from emerging threats, strengthening the overall IoT ecosystem's resilience to evolving cyber-attacks. This proactive security approach is critical for protecting sensitive data and maintaining the integrity of IoT systems.

6. Personalized Experiences and Human-Machine Interaction: AI-powered IoT sensors are poised to transform the way humans interact with technology. Sensors with facial recognition and natural language processing capabilities can personalise environments in smart homes based on individual preferences. Wearable sensors in healthcare can continuously monitor vital signs and provide personalised health insights. The incorporation of AI and IoT in these applications not only improves user experiences, but it also lays the groundwork for more intuitive and responsive human-machine interactions.

7. Intelligent Transportation and Autonomous Vehicles: The incorporation of AI and ML into IoT sensors is particularly transformative in the realms of intelligent transportation and autonomous vehicles. When enhanced with AI algorithms, sensors such as lidar, radar, and cameras enable vehicles to perceive their surroundings, make real-time decisions, and navigate complex environments. The combination of sensor data and machine learning models enables self-driving vehicles to adapt to changing road conditions, predict potential hazards, and improve overall road safety.

8. Overcoming Data Overload and Reducing Bandwidth Requirements: The sheer volume of data generated by the proliferation of IoT sensors is one of the challenges. Artificial intelligence and machine learning algorithms can assist in filtering, processing, and prioritising this data at the source, reducing the need to transmit massive amounts of raw data to centralised servers. This not only reduces bandwidth requirements but also allows for more efficient network resource utilisation. Edge-based processing, in conjunction with machine learning, ensures that only relevant and actionable insights are transmitted, thereby optimising data management in IoT ecosystems.

9. Continuous Learning and Adaptation: One of the distinguishing characteristics of AI and ML integration with IoT sensors is their ability to learn and adapt in real time. Traditional rule-based systems can be rigid, but AI algorithms have the ability to evolve and improve over time.

This adaptability is critical in dynamic environments with changing conditions and requirements. The ability of IoT sensors to learn from experience and adapt their behaviour, whether in industrial settings, smart cities, or healthcare, makes them more resilient and capable of addressing evolving challenges.

10. Ethical Considerations and Responsible AI: As AI and machine learning become more prevalent in IoT sensor systems, ethical considerations and responsible AI practises become increasingly important. Personal data must be used for profiling or decision-making in accordance with privacy regulations. AI models that are transparent and explainable are critical, especially in critical applications such as healthcare or finance. Building trust in AI-powered IoT systems requires striking the right balance between innovation and ethical considerations.

11. Standardization and Interoperability: Standardization and interoperability are critical for fully realising the potential of AI and ML integration with IoT sensors. A standardised framework ensures that different devices and systems can communicate and share data in real time. This is especially important as the Internet of Things ecosystem expands with new sensor types, manufacturers, and applications. Common standards make it easier to create scalable and interoperable solutions, resulting in a more cohesive and interconnected IoT landscape.

12. Collaborative Ecosystems and Open Platforms: As IoT sensors evolve with AI and ML integration, collaborative ecosystems and open platforms are emerging. This allows a wide range of stakeholders, such as device manufacturers, software developers, and data scientists, to contribute to the development and evolution of AI-powered IoT solutions. Open platforms promote the development of a wide range of applications, from smart homes to industrial automation, thereby unlocking new possibilities and propelling rapid advancements in the field.

Conclusion:

Integrating AI and machine learning into IoT sensors represents a transformative journey toward intelligent, adaptive, and context-aware systems. This synergy isn't just a step forward; it's a leap into a future in which machines become more perceptive, responsive, and capable of understanding and anticipating human needs. As AI and machine learning continue to advance, the evolution of IoT sensors will impact how we live, work, and interact with the world around us.

The convergence of AI, machine learning, and Internet of Things sensors has the potential to reshape industries, optimise processes, and improve people's quality of life. The possibilities are endless, from smart cities that adapt to their inhabitants' needs to healthcare systems that provide personalised treatments. However, this evolution brings with it new challenges, such as ethical concerns, security concerns, and the need for standardised frameworks. Addressing these issues will be critical to unlocking the full potential of AI-powered IoT sensors and ensuring a future that is not only intelligent but also ethical, secure, and inclusive. As the journey progresses, the collaborative efforts of researchers, engineers, policymakers, and society at large will shape the trajectory of this technological evolution, guiding it toward an innovative and responsible future.

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Detecting Financial Fraud in the Digital Age: The AI and ML Revolution

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Abstract:

Along with innovations in technology, swindlers are becoming smarter. Fraud is a major concern for the financial services industry. Earlier frauds in this industry were limited to robbery and loan defaults as the customers had limited ways to interact with their financial institutions. The technology innovation opened up various ways of interacting and transacting with financial services providers, which has led to a significant increase in several types of financial fraud. Technology is making a positive impact across many industries, including the financial sector. Technology is redefining what is possible in combating fraud and financial crimes. Artificial Intelligence (AI) and Machine Learning (ML) have grown drastically from being mere technology buzzwords to the commercial reality it is today. The aim of the present study is to understand the types of financial fraud and the role of AI and ML in financial fraud detection. Secondary data collected from websites and reports are used for the study.

Keywords: Digital Age, Money laundering, AI, ML, Financial Fraud, Predictive models

Introduction

Fraud exists in all walks of life and technological advancement in the field of commerce at the global level have evidenced new opportunities for online usage and on the other hand more opportunities for new financial fraud and abuse. With the growth of big data, artificial intelligence, and machine learning, new opportunities have arisen in using artificial intelligence and machine learning models to detect fraud.

Artificial Intelligence and Machine Learning are redefining the way companies do fraud detection these days. Before the advent of AI and ML, fraud prevention systems relied on set patterns and analyzed only restricted fraud patterns. But things have changed now, all credit to Artificial Intelligence and Machine Learning. By combining supervised learning algorithms trained on previous data with unsupervised learning, Artificial Intelligence helps to gain a better understanding of the customers' behaviors thus making it a good option for the effective detection of new and emerging fraud attacks.

Literature Review

Fraud has been a major issue in the financial service industry for years. Due to the increase in online financial transactions, fraudulent activities have also increased. With the advent of new technology, Artificial Intelligence and Machine Learning play a greater role in detecting financial crimes and frauds.

The following reviews showcase the usage of artificial intelligence, and machine learning in financial fraud detection, which are used as a base for conducting the present study.

Choi & Lee (2018) in their research work an artificial intelligence approach to financial fraud detection under IoT environment: a survey of implementation surveyed the financial fraud methods using machine learning and deep learning methodology and also proposed a process for accurate fraud detection. Based on the advantages and limitations of the existing methods, they have developed a model for fraud detection and validated the model with actual financial transactions data of the year 2015 from Korea. West & Bhattacharya (2016) in their research work intelligent financial fraud detection: a comprehensive review provided a review of financial fraud detection methods using data mining methods and computational intelligence-based techniques. Scientific literature for the period 2004-2014, was analyzed in the study. They have explored some types of fraud and data mining methods. They have also mentioned that there is an opportunity to examine the performance of existing methods and cost-benefit analysis of computational fraud detection.

Bolton & Hand (2002) in their research work statistical fraud detection: a review, described the tools available for statistical fraud detection and the areas in which fraud detection technologies are most used. The researchers mentioned that statistics and machine learning provide effective technologies for fraud detection and have been applied successfully to detect activities such as money laundering, e-commerce credit card fraud etc.

Statement of the Problem

Financial fraud is a growing concern in the modern financial system, causing significant losses to individuals, organizations, and economies. Traditional methods of detecting financial fraud, such as rule-based systems, statistical analysis, expert systems, and others, have limitations in terms of accuracy, speed, and adaptability to changing fraud patterns. As a result, there is a growing demand for more advanced and sophisticated methods of financial fraud detection. Artificial intelligence (AI) and machine learning (ML) offer potential solutions to address the limitations of traditional fraud detection methods. However, the effective implementation of AI and ML in financial fraud detection requires a thorough understanding of the algorithms, techniques, and tools used, as well as the challenges and limitations associated with their use. The present study aims at exploring the use of AI and ML algorithms for financial fraud detection.

Objective and Methodology

The objectives of the present study are to understand the different types of financial fraud, to investigate the current methods of detecting financial fraud and their limitations and to explore the potential of using AI and ML algorithms for financial fraud detection. To achieve these objectives the study follows descriptive methodology and secondary data collected from published reports and articles are used for the study.

Research Discussion

Frauds are the biggest challenge for the finance industry and its customers which results in huge losses. With the increase in the number of transactions happening across the globe, the threat of financial

fraud has increased too. The finance industry is now utilizing state of art artificial intelligence and machine learning technologies to capture these frauds as early as possible and prevent them from taking place.

Types of Financial Fraud

Financial frauds are of many different types. Some of the major types of frauds selected from the list provided in the Federal Bureau of Investigation, Financial Crimes Report (2010-2011), United States are listed below (Figure 1)
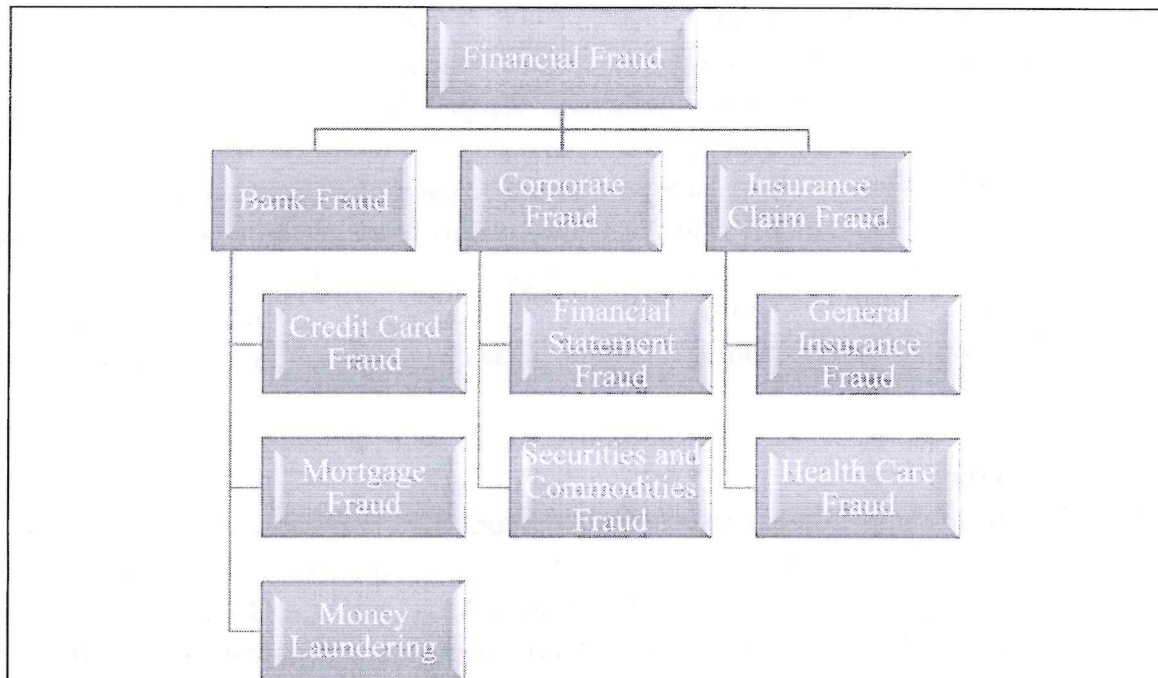
Figure 1: Types of Financial Fraud

- ❖ **Credit Card Fraud:** Credit card fraud refers to the unauthorized use of a person's credit card to perform fraudulent transactions without the user's knowledge. The transactions can be performed using the physical card, where the card was either lost or stolen, but is often performed remotely. The cardholder's information may be acquired by phishing, which involves a fraudster impersonating a finance official to convince the user to divulge their details, swipers or skimmers provide an interface to an ATM or POS device which can read the card directly, or entire databases of user's information can be obtained if the fraudster is able to breach the financial institution's network security or enlist the help of an assistant within the company. The ambiguity and availability of these remote methods have given rise to the prevalence of organized crime in credit card fraud.
- ❖ **Mortgage Fraud:** Mortgage fraud is a specific form of financial fraud that refers to the manipulation of property or mortgage documents. It is often committed to misrepresent the value of a property for the purpose of influencing a lender to fund a loan for it.
- ❖ **Money Laundering:** Money laundering is a method used by criminals to insert proceeds obtained from criminal ventures into valid businesses. This hides the origin of the money, giving them the appearance of legal income and making it difficult to track their crimes.
- ❖ **Financial Statement Fraud:** Financial statements are the documents published by a company that elucidates details such as their expenses, loans, income, and profits. The various financial statements

that the company releases give an overall picture of the company's status, and can be used to indicate how successful the company is, how it influences stock prices, etc.

Financial statement fraud, also known as corporate fraud, involves falsifying these statements to make the company appear more profitable. it is difficult to diagnose financial statement fraud because of a general lack of understanding of the field, the infrequency in which it occurs, and the fact that it is usually committed by knowledgeable people within the industry who are capable of covering their dishonesty.

❖ **Securities and Commodities Fraud**: Securities and commodities fraud refers to a variety of methods by which a person is misled for investing in a company stock/commodity based on false information. It includes Pyramid Schemes, Ponzi Schemes, Hedge Fund Fraud, Foreign Exchange Fraud, Embezzlement, etc.

❖ **Insurance Fraud:** Insurance fraud is a fraud that can be committed at any point during the insurance process, and by any people in the chain. Insurance claims fraud occurs when a customer submits a fraudulent insurance claim as a result of an exaggerated injury or loss of assets, or a completely fraudulent event. A common form of claims fraud is automobile insurance fraud, which is often committed by faking or intentionally committing accidents that result in excessive repair and injury costs.

Financial Fraud Trend in India

Financial fraud trends in India according to a report titled Experian India Fraud Report 2018-19 by Experian Services India Pvt. Ltd., a credit information services company is shown in Figure 2. Identity theft accounted for 28 percent of all frauds, while Market Alert Fraud (MAF) accounted for another 28 percent, followed by fraud contact information at 25 percent and document fabrication at 10 percent.

Source: livemint.com
Figure 2: Financial Fraud Trends in India

Current methods of detecting financial fraud and their limitations

Current methods of detecting financial fraud and their limitations are:

- *Rule-based systems*: These systems use predefined rules and criteria to identify suspicious transactions. The limitations of these systems include being prone to false alarms, being unable to detect new and unknown forms of fraud, and being unable to adapt to changes in fraudulent activities.
- *Statistical analysis*: This method involves analyzing large amounts of financial data to identify patterns and anomalies that may indicate fraud. Limitations of this method include being unable to detect fraud in real-time and the need for large amounts of historical data to be effective.
- *Expert systems:* These systems rely on human expertise and knowledge to identify fraud. Limitations include being prone to human error, being limited by the expertise of the individuals involved, and being time-consuming.

Overall, current methods of detecting financial fraud have limitations in terms of accuracy, speed, and adaptability to changing fraud patterns. This highlights the need for a more advanced and sophisticated approach using AI and machine learning.

Artificial Intelligence (AI)

Artificial Intelligence refers to the simulation of human intelligence in machines that are programmed to think like humans and imitate their actions. The ideal characteristic of artificial intelligence is its ability to rationalize and take actions that have the best chance of achieving a specific goal.

Machine Learning (ML)

A subset of artificial intelligence is machine learning. Machine learning (ML) is the study and practice of designing and implementing algorithms that can learn from the past. Without arousing the suspicions of people completing transactions. Deep learning techniques enable this automatic learning through the absorption of huge amounts of unstructured data such as text, images, or video. Machine learning can combat financial fraud by utilising huge data more effectively and rapidly than humans ever could.
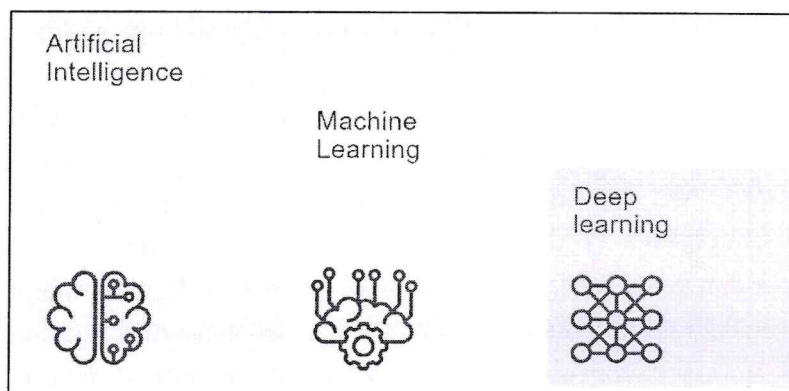
Figure 3: Artificial Intelligence vs Machine Learning

Role of AI and ML in Fraud Detection

Artificial Intelligence and Machine Learning have popped up as powerful technology that has the potential to prevent financial fraud. Fraud Detection with Machine Learning becomes possible due to the ability of ML algorithms to learn from historical fraud patterns and recognize them in future transactions.

Machine Learning algorithms appear more effective than humans when it comes to the speed of information processing. Also, ML algorithms are able to find sophisticated fraud traits that a human simply cannot detect.
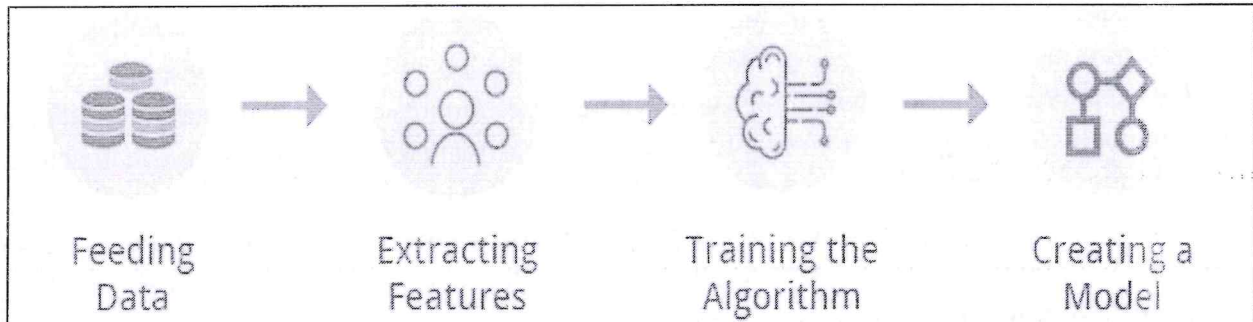
Source: intellipaat blog

Figure 4: Basic structure of the working of fraud detection algorithms using Machine Learning

Figure 4 depicts the basic structure of the working of fraud detection algorithms using machine learning. The first step is to feed the data into the model. The next step is to extract the features of each and every thread associated with the transaction process. Once the fraud detection algorithm is created, it has to be trained by providing customers data, to help the algorithm to learn how to distinguish between fraud and genuine transactions. Once the training is completed with the specific data set, the model is ready for detecting fraudulent and non-fraudulent transactions.

Artificial Intelligence (AI) and Machine Learning (ML) play a significant role in financial fraud detection. They help organizations identify and prevent fraudulent activities more effectively and efficiently. AI algorithms can analyze large amounts of data and identify patterns and anomalies that may indicate fraudulent behavior. ML algorithms, in particular, can be trained to detect fraud based on historical data and make predictions about the likelihood of future fraud. Some specific ways in which AI and ML are used for financial fraud detection are:

- *Behavioral analysis*: AI algorithms can analyze customer transactions and behaviors to identify any unusual or suspicious activities.
- *Risk scoring:* AI and ML algorithms can analyze customer data to determine the risk level associated with a particular transaction, helping organizations prioritize their investigations.
- *Fraud detection models:* ML algorithms can be trained to detect fraud based on historical data, and then applied to new transactions to identify potential fraud in real time.
- *Natural language processing (NLP):* AI algorithms can analyze large amounts of text data, such as emails, chat logs, and customer feedback, to identify any instances of fraudulent behavior.
- *Fraud network detection:* AI algorithms can analyze large amounts of data to identify relationships between different fraudulent activities, helping organizations understand the extent of fraud and identify the key players involved in these activities.

Fraud detection is the most important use case of artificial intelligence. Artificial intelligence improves fraud detection by combining supervised learning algorithms with unsupervised learning to the effect of gaining a better understanding of customers' behaviors. A better understanding of customers' behaviors allows organizations to better identify and prevent unauthorized activity.
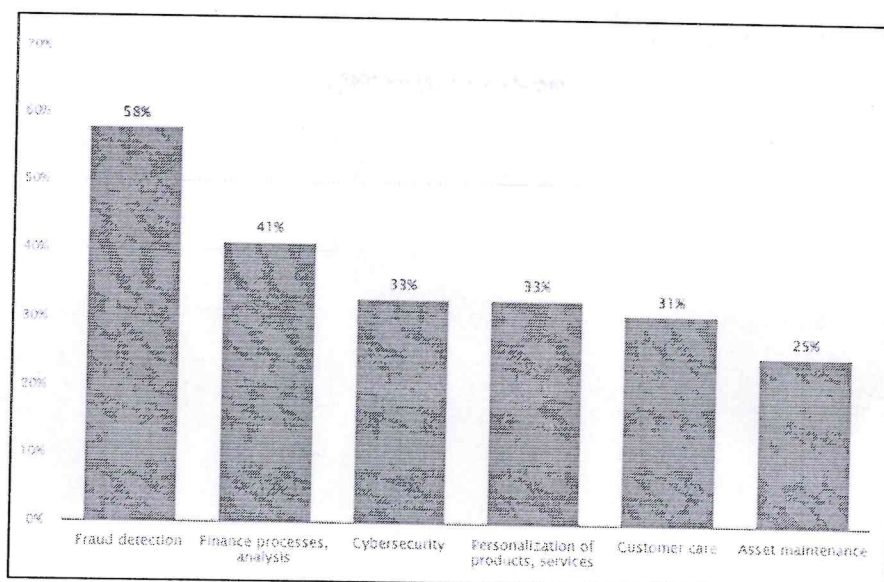
Source: Published by Bergur Thormundsson, Mar 17, 2022

Figure 5: AI use cases in financial services industry worldwide as of 2020

AI Techniques in Fraud Detection:

The main AI techniques used for fraud detection include:

- **Data mining** to classify, cluster, and segment the data and automatically find associations and rules in the data that may signify interesting patterns, including those related to fraud.
- **Expert systems** to encode expertise for detecting fraud in the form of rules.
- **Pattern recognition** to detect approximate classes, clusters, or patterns of suspicious behavior either automatically (unsupervised) or to match given inputs.
- **Machine learning** techniques to automatically identify characteristics of fraud.
- **Neural nets** to independently generate classification, clustering, generalization, and forecasting that can then be compared against conclusions raised in internal audits or formal financial documents such as 10-Q.

Other techniques such as link analysis, Bayesian networks, decision theory, and sequence matching are also used for fraud detection. A new and novel technique called the System properties approach has also been employed wherever rank data is available.

Statistical analysis of research data is the most comprehensive method for determining if data fraud exists. Data fraud as defined by the Office of Research Integrity (ORI) includes fabrication, falsification, and plagiarism.

Machine Learning Fraud Detection Models
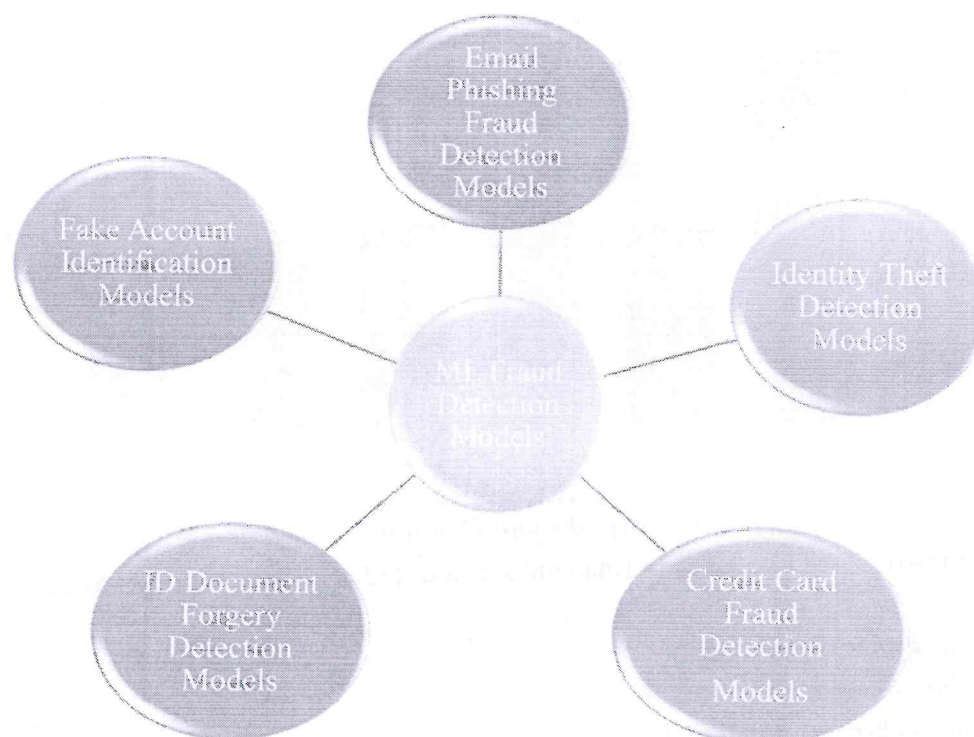
Figure 6: Machine Learning Fraud Detection Models

Some of the machine learning fraud detection models are listed below:

❖ **Email Phishing Fraud Detection Models**: Phishing emails represent spam letters that have falsified intentions. Phishers make fake websites and their URLs are very similar both visually and semantically to the originals. They are mostly threats to the Banking sector, multinational companies, and medical establishments.

Logistic regression is one of the machine learning algorithms used for phishing detection. Other ways are of using traditional machine learning classification models such as SVM, Naive Bayes, and Extreme Learning Machines

❖ **Identity Theft Detection Models**: Identity theft detection is considered an anomaly detection challenge, so various state-of-art unsupervised Machine Learning algorithms such as LOF, PCA, one-class SVM, and Isolation Forest help find abnormal patterns of a user's behavior in order to detect unauthorized actions. They work as a litmus test to find anomalies in the field of normal behavior. These algorithms group abnormal behavior data points together in a dense cluster than differs from clusters of normal behaviors.

❖ **Credit Card Fraud Detection Models**: Fraud models can be tackled with both supervised and unsupervised Machine Learning algorithms.

❖ **ID Document Forgery Detection Models**: ID document forgery detection deals with image processing. Certain techniques are used to make sense of the visual information that an image carries. CNN models are usually trained to perform this task, whereas neural networks are built in a way to minimize losses. Forgery detection technique relies on hyperspectral image analysis. This method implies building an electromagnetic spectrum map to obtain the spectrum for each pixel in the image.

❖ **Fake Account Identification Models:** Fake account identification is a classification problem, therefore the first step is selecting the profile that needs to be classified as fake. The most important part of classification is feature selection, i.e., parameters such as rate of engagement, activity, number of followers compared to the number of people the account is following, and the relevancy of comments. After the feature matrix is built, it is fed into the classification model — which may be one of the most efficient binary classifiers, such as Naive Bayes, SVM, Decision Trees, Logistic Regression, etc. The classifier can be continually trained with new data on fake and real accounts, which helps increase the accuracy of its predictions.

Real-World Examples of Fraud Detection Using Machine Learning

Businesses across industries such as e-commerce, banking, online gaming, and healthcare are using artificial intelligence and machine learning to detect financial fraud. No matter what industry you are in, you can always benefit from the power of AI and ML to process large amounts of data and detect patterns to protect against fraud. For example, ML and AI in finance detect account takeovers, unauthorized access, and other fraud by detecting patterns in customer behavior. Some real-world examples of companies that are already leveraging the power of financial fraud detection through machine learning are:

- Compliance.ai
- PayPal
- MasterCard
- Feedzai

Compliace.ai: Compliance.ai compliance management software leverages adaptive machine learning models in the financial industry to automate research and track financial regulatory updates on a single platform.

PayPal: PayPal, a leading global fintech company, is also using machine learning to improve its fraud detection and risk management capabilities. Using a combination of linear neural networks and deep learning techniques, PayPal's risk management engines can determine the risk levels associated with a customer within milliseconds.

MasterCard: MasterCard, the world's second-largest payments company, integrates AI and ML to track and process variables such as transaction time, size, location, device, and purchase data. MasterCard's fraud detection, based on ML, assesses customer account behavior for each transaction and provides real-time insight into whether a transaction is genuine or fraudulent.

Feedzai: Feedzai, a fintech company, develops real-time machine learning solutions to detect fraudulent payment transactions in finance, retail, e-commerce and other industries. The company believes that a fine-tuned machine learning tool can detect up to 95% of all fraud while reducing human labor in the investigation phase, which accounts for 25% of fraud expenditure.

Brief statistics where fraud detection worked:

- Highmark Inc. has saved hundreds of millions of dollars in 2019 due to fraud, waste, and abuse, amounting to around $250 million. Moreover, they have saved over $850 million in the previous five years by deploying AI for fraud detection (Artificial Intelligence).

- Microsoft spends 33 percent of its yearly sales to secure cloud storage from any type of fraud, generating up to 44.5 percent additional profit annually.
- A scam involving sim swapping across Europe was spotted by an AI, which saved over 100 victims and 3.5 million euros, and caught 26 fraudsters.
- A teenager was discovered hacking Twitter and committing fraud totaling more than $110,000, and the money was returned by the fraud detector.
- By detecting the Wirecard Meltdown scam, an AI has saved €70.74 million.

Benefits of using AI and ML in Fraud Detection:

When processing massive datasets, machines are far superior to humans. They can discover and distinguish thousands of purchase journey patterns, as opposed to the handful caught by rules. Some of the benefits of fraud detection using machine learning are shown in Figure 7.
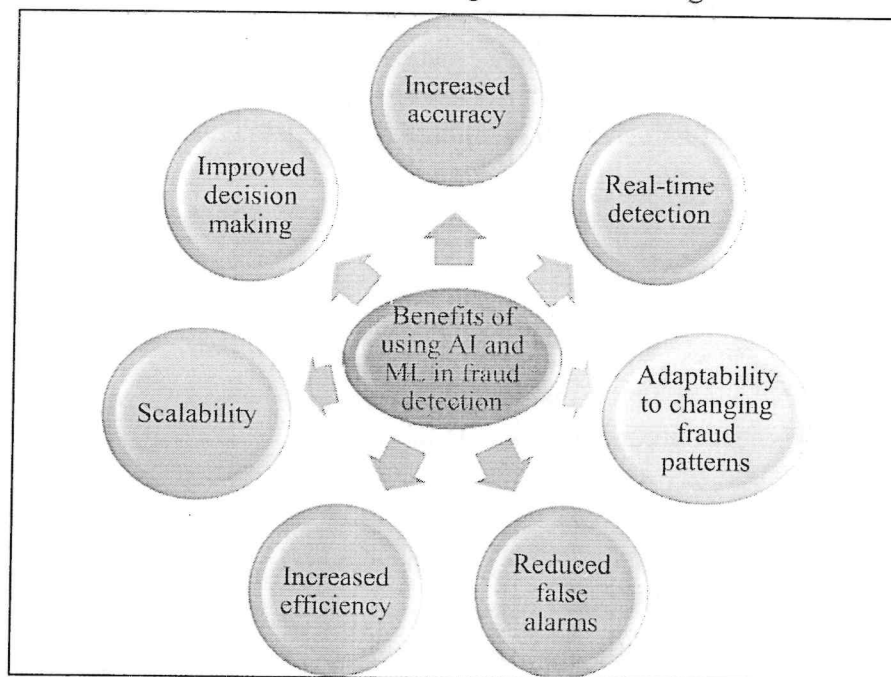
Figure 7: Benefits of AI and ML in Fraud Detection

The benefits of using Artificial Intelligence (AI) and Machine Learning (ML) in fraud detection include:

- *Increased accuracy*: AI and ML algorithms can analyze large amounts of financial data and identify patterns and anomalies that may indicate fraud, leading to improved accuracy in detecting fraud.
- *Real-time detection*: AI and ML algorithms can process large amounts of financial data in real-time, allowing for the early detection of fraud.
- *Adaptability to changing fraud patterns*: AI and ML algorithms can learn and adapt to changes in fraudulent activities, allowing them to evolve and improve over time.
- *Reduced false alarms:* AI and ML algorithms can reduce false alarms by analyzing large amounts of data and making more accurate predictions.
- *Increased efficiency*: AI and ML algorithms can automate and streamline the fraud detection process, reducing the need for manual intervention and freeing up resources for other tasks.

- *Scalability:* AI and ML algorithms can be easily scaled to handle large amounts of data, making them suitable for use in large financial systems.
- *Improved decision-making:* AI and ML algorithms can provide insights and recommendations for decision-making, helping organizations make more informed decisions about their financial activities.

Conclusion

The emergence of artificial intelligence and machine learning technologies has ushered in a transformative era in the battle against financial fraud in the digital age. This research study has provided a comprehensive overview of the significant strides made in fraud detection through AI and ML, highlighting their potential to revolutionize the financial industry's approach to security. From sophisticated anomaly detection algorithms to predictive modeling and real-time monitoring, these advancements offer powerful tools for safeguarding financial systems and protecting the interests of individuals and organizations alike. As we move forward, it is imperative that policymakers, financial institutions, and researchers continue to collaborate and adapt to the evolving landscape of financial fraud, harnessing the full potential of AI and ML to stay one step ahead of increasingly sophisticated fraudulent activities. This synergy between technology and human expertise holds the promise of a more secure, efficient, and resilient financial ecosystem for the digital age.

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An Empirical study on the future plans and micro and macro factors affecting undergraduate students' life ambitions and career choices.

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Abstract

Students' career choice is one of the most critical decisions in their life because it will determine the type of role they will need to play in society in the future. One of the most important life processes is choosing a career. This study aims to investigate the micro and macro factors influencing undergraduate students' aspirations and career decisions. Only U.G. students in Bangalore, Karnataka, are the subject of this study. Undergraduate students were selected because they would be faced with deciding what career to pursue immediately after graduation.

A total of 18 colleges were surveyed, which included nine technical courses like engineering and medicine, and nine nontechnical colleges were taken into consideration, which had courses like B Com, B B A, and B A of the 270 questionnaires collected, 13 were incomplete and filled without essential details, therefore, were ignored. Statistical package software for social science (SPSS) was used to analyse the collected data. Relevant descriptive and inferential statistics were used to treat the data keeping the study's primary objectives in view. Charts depict the nature of the sample of the relevant variables like plans, intentions, and careers.

It was found in the research that many students want to take up further education after their undergraduate studies,which is nearly 69 %, which calls for better sensitization to the options available at the postgraduate level. Therefore, there must be a sincere effort to acquaint students with the courses available at the post-graduate level, and also specializations available must be brought to the notice of the student in their final year of UG study so that they can make an informed decision

Further studies are strongly recommended to investigate students' career choice that is affected by micro and macro-level factors.

Keywords: micro factors, macro factors, careerchoice, undergraduate students,

Introduction

A student's chosen profession or occupation is their career, consisting of a series of trades or positions frequently related in terms of skill, knowledge, and competence. A career frequently requires a long-term dedication to a single profession or industry and may require some education, training, or experience.

Undergraduate students have various career options, and the best one for them will depend on their interests, talents, values, and ambitions. For undergraduate students, standard career options include business, management, engineering, health care, education, etc.

Undergraduates in India have a wide range of life ambitions and career choices; a few micro factors like their performance in the present course, aspiration of family members, advice of elders & teachers, general public opinion, the influence of friends, changes in career, content, and orientation of education, changes in economic trends, and financial position of their family will affect their career choices.

In India, approximately. 75% of final-year undergraduate college students want to continue their further education in postgraduate management, postgraduate engineering, and postgraduate general education.Approximately 10% of the students are in a dilemma in making their choice, and the Rest, around 15 %,take up employment and work in fields like engineering, medicine, law, business, computer science, and finance. People often see these jobs as a way to advancesocially and financially and move up the social ladder because they pay well and are respected.

It's important to remember that Indian college students' life goals and career choices are also affected by things like the number of job opportunities, market trends, government policies, and the state of the global economy.

Review of literature

Umasankar, T., & Mahajan, R. (2022) examined how students choose their careers and whether they prefer joining the Indian armed forces to other careers. This qualitative study applied Maslow's motivational theory to jobs in the armed forces to identify aspirations and create a theoretical framework for career choices. Students' preferences were examined using purposeful sampling. The Post-Hock Tukey tests and PLS-SEM are used to validate and analyze data. The armed forces cannot recruit students because they lack interest in military service. His career decision impacts any student's future. It was challenging to make the right decision because of all the interrelated factors. To make the military a top option, the government must act.

Aggarwal, A., & Shrivastava, U. (2021)suggested that there was at least a minimally positive relationship between students' academic performance and career-level expectations. Although not at a reasonable level and exhibiting relatively poor academic performance, students have high career ambitions. The country's youth and aspirations can flourish in an environment that policymakers can help create.

Bhattacharjee, A., &Marak, M. B. D. (2021)focused on identifying the personal factors that influence undergraduate students' preferred career choices. The self-efficacy element of personal factors most influences the student's career decisions. The sub-dimensions of personal and career choice had a moderately positive significant relationship.

Sahu, R., Dash, S. R., and Das, S. (2021)examined the student's career, memory, interest, knowledge, environment, and attitude before predicting the best stream to make the career comfortable so the student can explore it. Selecting students' careers requires a hybridized distance measure in a picture-fuzzy environment. Picture fuzzy numbers represent student, subject, and feature evaluations. Two hybridization methods are Harsdorf-Hamming and Harsdorf-Euclidean. After that, the rough set theory decides if a subject is right for a student, even if they disagree about which stream to take. Lower and higher approximation with wild set theory's boundary region manages inconsistency. Finally, two case studies demonstrate the idea's applicability.

Hamid, M. A. (2020)examined how starting salary, employer reputation, and working environment affect job selection preferences among Malaysian accounting students. The research model is tested using correlation and difference. Starting salary, employer reputation, and working environment affect job selection preferences among future accounting graduates. The working environment dominates job selection. Public and private universities had similar job selection preferences.

Lally, P. S., & Kerr, G. A. (2015) Examined university student-athlete career planning and its relationship to athletic and student roles. Four university student-athletes were interviewed retrospectively. Participants focused on athletics in college with unclear career goals. The participants abandoned their sports career goals in their final college years and prioritized student hood. The findings support Brown and Hartley's (1998) idea that student-athletes can invest in athlete and student role identities and explore non-support career options.

Objectives of the present study

The present study aims at achieving the following objectives.
1. To determine graduate students' career goals in Bangalore,
2. To determine the macro and micro factors that affect respondents' future intentions, plans, and career goals,
3. To understand the extent of the difference in the influence of micro and macro factors on students' plans and career choices.

Research Design

In Bangalore, final-year undergraduate students in technical and non-technical programs were selected for the current study.The colleges to be sampled were chosen from a list of colleges maintained by Bangalore University, the Directorate of Collegiate Education, and the All India Council for Technical Education. The colleges were selected using a method of systematic random sampling. As and when they exited the class, fifteen final-year students from each college were approached at random.

A total of 18 colleges were surveyed, nine of which offered technical courses like engineering and medicine, and nine of which offered nontechnical courses like B Com, B B A, and B A. Of the 270 questionnaires collected, 13 were left blank or incomplete and therefore disregarded.

A structured questionnaire and an interview schedule were used to gather the primary data for the current study. The secondary data was collected by reading several research papers and articles in reputable journals and examining career-related articles and write-ups on particular websites, magazines, and newspapers.

Data Analysis

The data collected from the samples are coded appropriately using SPSS. Relevant descriptive and inferential statistics were used to treat the data keeping the study's primary objectives in view. Charts depict the nature of the sample of the relevant variables like future plans, intentions, and careers.

Tools and Techniques:

1. The percentage analysis method
2. Testing of Differences between Proportions for large sample test at a 5% significance level: to understand whether the students prefer a certainfuture plan or are influenced by macro or micro factors in their career choice.

The formula for large sample tests of proportion are

$$Z = \frac{\hat{p} - p_0}{\sqrt{\dfrac{p_0 q_0}{n}}} \qquad Z = \frac{(\hat{p}_1 - \hat{p}_2) - 0}{\sqrt{\hat{p}(1 - \hat{p})\left(\dfrac{1}{n_1} + \dfrac{1}{n_2}\right)}}$$

- P is % of students preferring a future plan or are influenced by macro or micro factors in their choice for a career, P0 & Q0 are assumed to be point 5 each with the assumption that there is no specific

preference for a particular future plan or there is no difference in the influence of micro and macro factors in career choice.
- In the test of difference of proportions, P1 is the proportion of students influenced by macro factors, and P2 is the proportion of students influenced by micro factors
- Bar diagrams for better pictorial understanding.

DATA ANALYSIS AND FINDINGS

This part of the research paper analyses the primary data collected from student respondent youth. It is divided into various sections depending on the objectives and compatibility of the data.

Section A – Future plans and life ambitions of students
This section analyses the primary data collected from the respondents relating to their future plans and intentions, including their life ambitions.

Figures 1 to 4 given below analyze these future plans in detail.

Fig. 1 – Distribution of respondent students based on future plans.

Future Plan
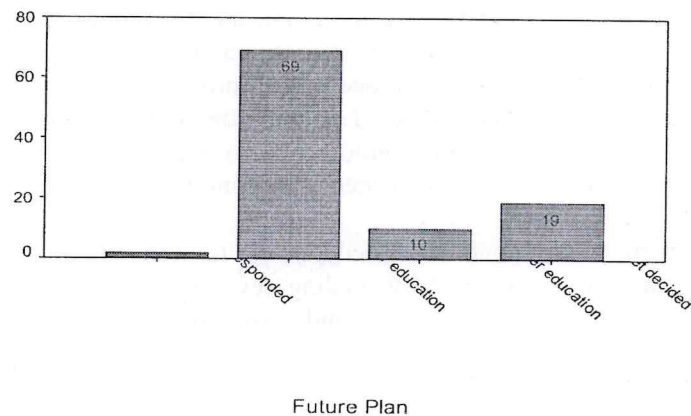
The above figure1 shows that the preferred choice of students after completing their graduation is taking up further studies by pursuing their post-graduation in their educational field,as nearly seven out of ten students surveyed wanted to further their education which shows a strong trend of getting a master's degree which may be because they perceive better exposure and better employment opportunities after doing a post-graduate degree. However, the fact that nearly 19 percent or one out of every five students is undecided is disturbing as even at their graduation level; they have yet to decidetheir future plans.

Fig. 2 – Educational future plans of respondent students
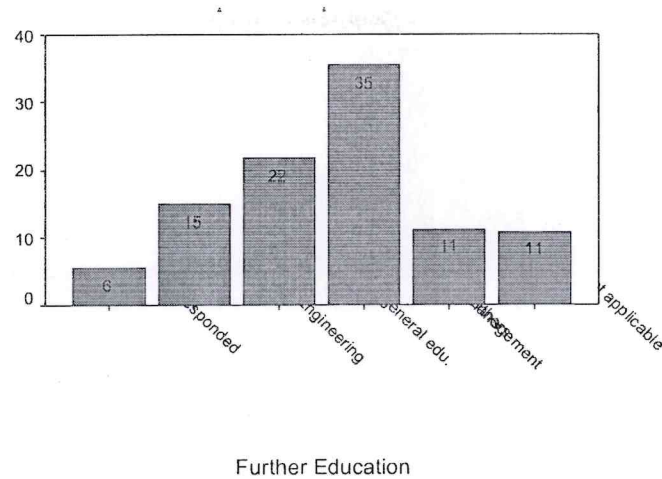
Further Education

Figure 2 reveals that there is a growing trend towards PG in management education as nearly 35% of the respondents have opted for doing their master's in management education this may be because of the fact that students perceive greater employment opportunities after this course.

Fig. 3 - Noneducational future of respondent students

Future plans
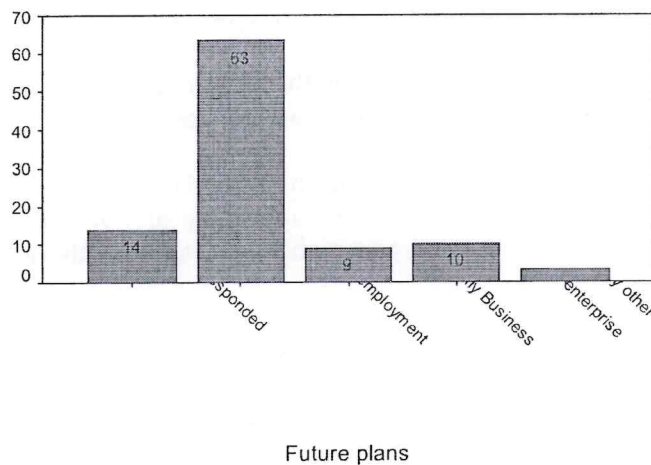
The above figure shows that among students who do not want to take up further studies, most of them want to take up employment, which is the preferred route after graduation,which stood at nearly sixty-three percent, which may be because they are seeking financial independence. However, those who want to become entrepreneurs are only ten percent, and those who want to join their family business is only nine percent, which indicates a low level of the risk appetite of the students.

643

Fig. 4 – Career objectives of respondent students
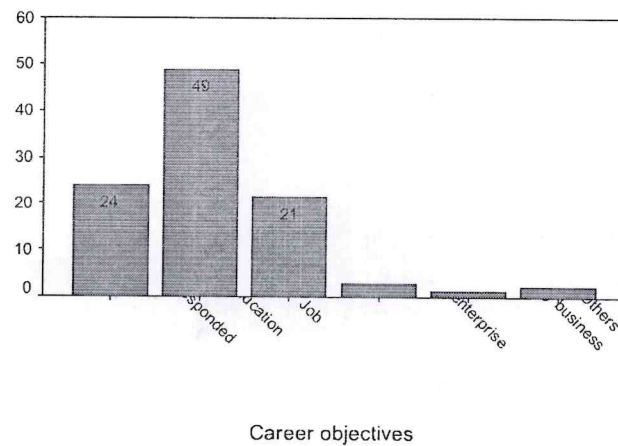
Career objectives

This figure reveals the answer to what the students think will help them realize their career objectives in the long run. A majority of students, that is nearly half of them that is fifty percent, thought that their further education would help them reach their career choice, andaround twenty percent that is one out of five thought that their job would take them to their destination, the others were nearly negligible.

Section A - Overall analysis

On observing figures 1 to 4 of students, it can be noticed that the future plan of students is predominantly pursuing further education and going for a job. In other words,students' future plans are mainly educational.

H0: There is no significant difference between the proportion of students who want to take up further studies and those who do not want to take up further studies.

Using the large sample test for proportion mentioned in the tools and techniques,
The test value is Z= 7.72 which is higher than the table value of 1.96. Therefore, there is a significant difference between students who want to take up higher education and those who do not want to take up higher education.

Section B- Influence of factors on future plans and career choice

Many factors influence the respondents' future plans, intentions, career objectives, and life ambitions. They may be within themselves or in the surroundings, which might be micro or macro.

This section tries to analyze the various factors influencing the decision of students regarding their future plans and career choices and is represented in figures 5 to 14

The following figures reveal the percentage of distribution of respondents across various factors. They have much bearing on the future plans and intentions of respondent students.

Fig. 5

Dependence of future plans on course performance

Performance in the present course
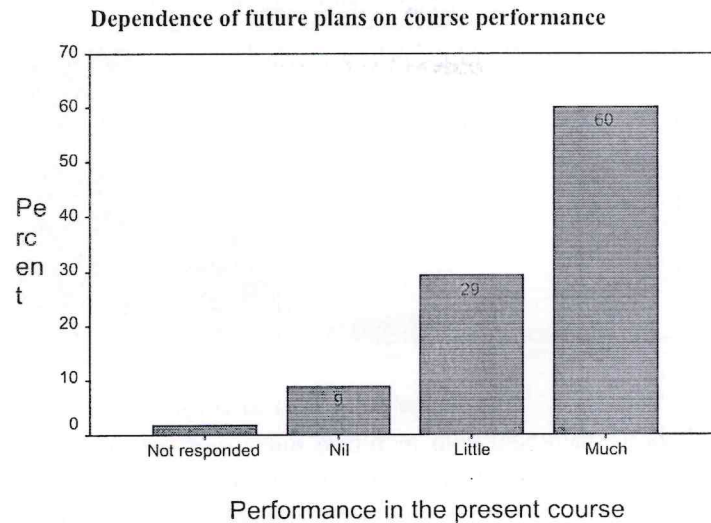
Nearly sixty percentage of the students base their future plans on the performance of their current course, which means if for example they are performing well in their management education, they will take up a career in management and if they are not doing well in their current course they start looking for other career choices

Fig. 6

Dependence of future plans on family members

Aspiration of family members
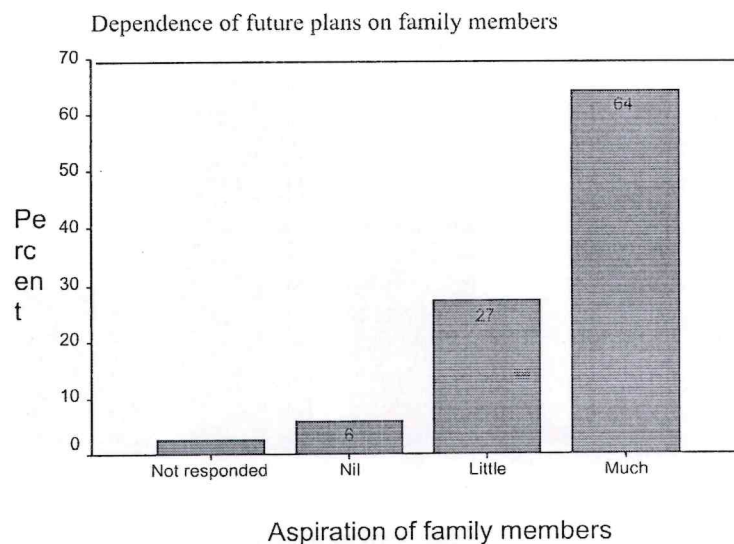
In the Indian scenario, the family still plays a huge role in deciding their future plans as nearly sixty four percentage said that their future depended on the consent and approval of their family members, for example if the family wanted the student to take up higher education rather than take up a job, it will be more likely that they would do the same.

Fig. 7

Dependence of future plans on elder's and teacher's advice

Advice of elders and teachers
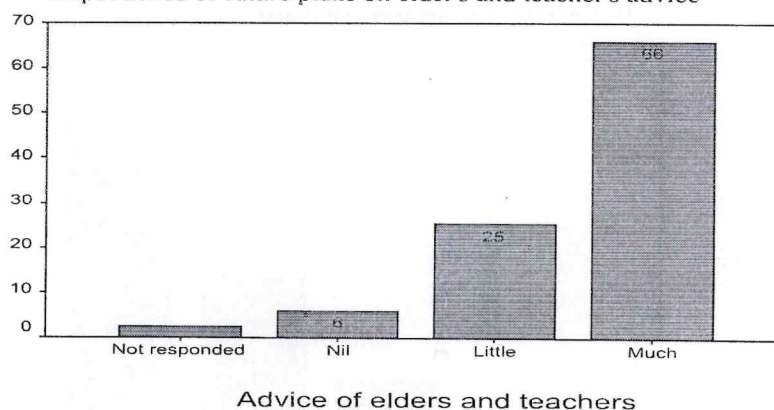
Another factor which plays a prominent role in future plans and career choices is the advice given by teachers and elders, two out of three respondents mentioned that they would their future on the suggestions of teachers and elders, which puts a great responsibility on teachers to always give the right direction.

Fig. 8

Dependence on general public opinion

General public opinion
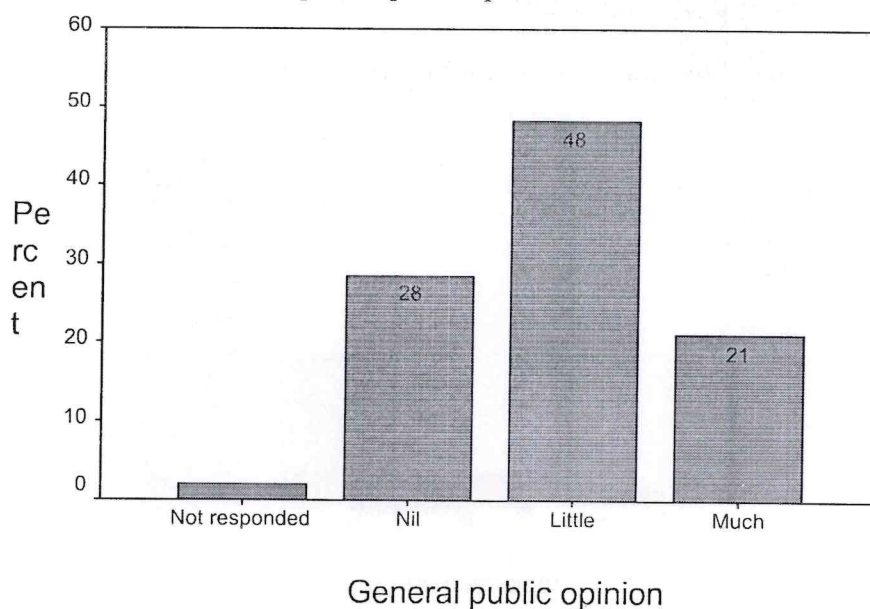
One of the factors which has little or no impact on the students choice for his future is the public opinion, this is very heartening as nearly eighty percent of the respondants were not going to base their career and future plans on the opinion of the general public, which shows a trend of personal autonomy rather than public dependence.

Fig. 9

Dependence on friend's influence

Influence of friends
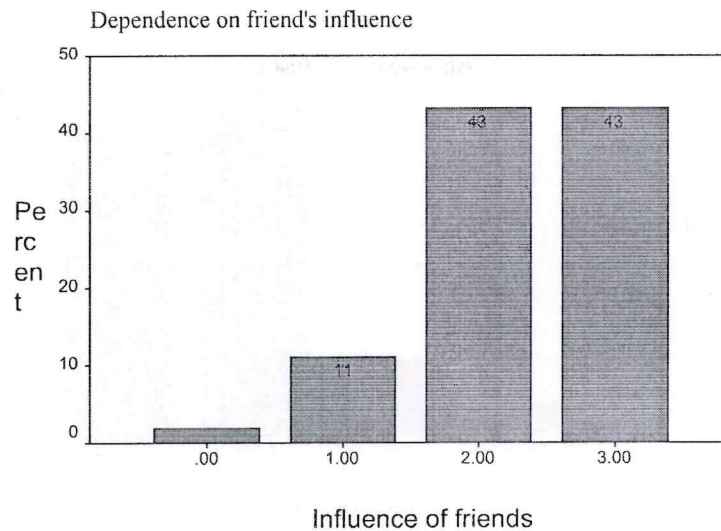
This factor which is the influence of friends had a split verdict where their friends influenced forty-three percent of students, and the same percentage had only a minor influence from their friends in choosing their future course of action.

This throws light on the fact that friends do have a considerable influence in their career choices , but it is relatively less than other factors like family and advise of teachers and elders.

Fig. 10

Dependence on career trends

Changes in career
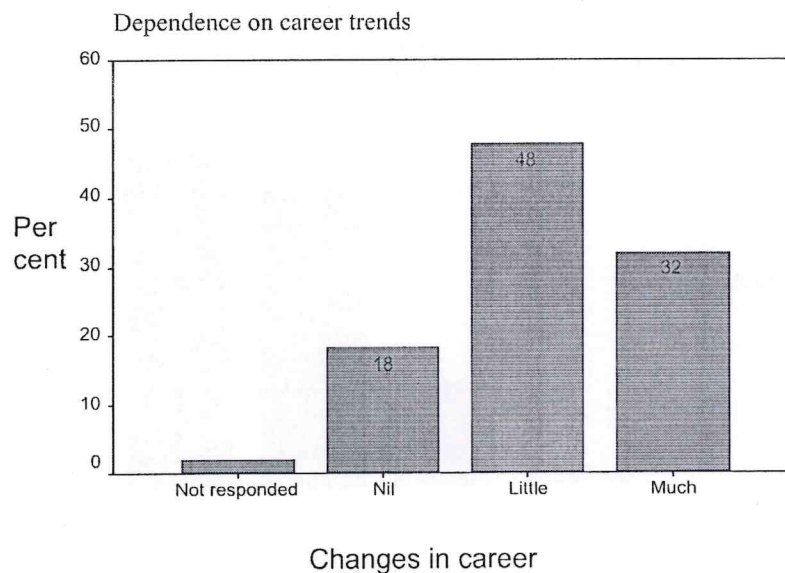
Usually students take up careers based on the trending careers in the market, like computer hardware and software engineers or data analytics, however, the respondents in this research said that they would prefer to go on their choices rather than the trends in the market as nearly half of the students gave little weightage to the same and one-third of the respondents saidthey would pick up a trending career.

Fig. 11

Dependence on education system

Content and orientation of education
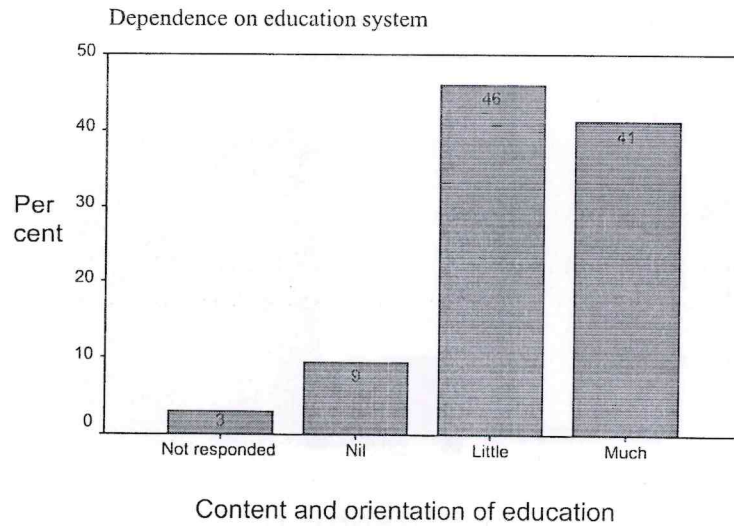
Another factor which through up a mixed verdict on the career choice was the content and orientation of the education system. At the same time,forty-six percent of the students said that they would choose their future plans on the type of education they got and were likely to get, fifty percent of the students said that they were not affected by the present education system or the same had a little impact on their plans, this shows a growing apathy towards the education system and a gradual loss of faith in education for at least half of the students.

Fig. 12

Dependence on economic trends

Changes in economic trends
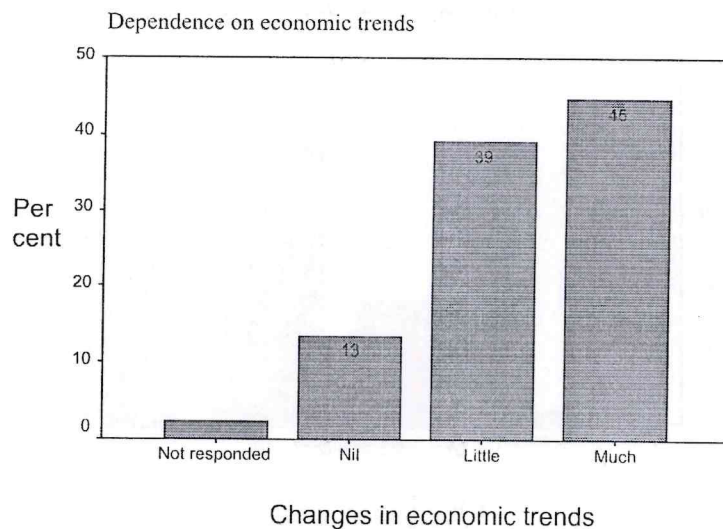
Another macro factor which was considered was the change in economic trends, and it threw up a mixed response as nearly fifty-two percent of students said that they felt little or no impact, of changes in the economic scenario on their future plans, howeverabout forty-five percent of the respondents felt that their future was dependant on the economic trends. This shows that nearly half of the students had a external locus of control and felt that they would not have a good future if the economy did badly.

Fig. 13

Dependence on respondent's analysis and decision
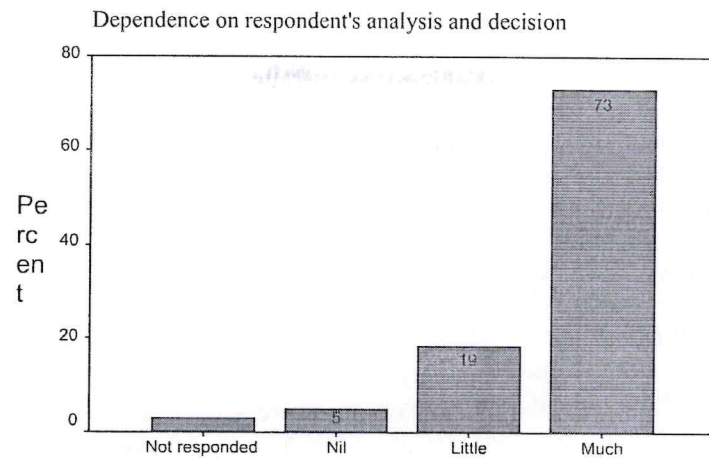
My analysis and decision

A very important factor, and the factor which almost got the highest weightage in having an influence on the future and career of the students was their own analysis and decision, which means that majority of the students that is nearly three fourth of the students believed that it was finally up to them to make a rational analysis and take a decision on their own future and career.

Fig.14

Dependence on family's financial positiion
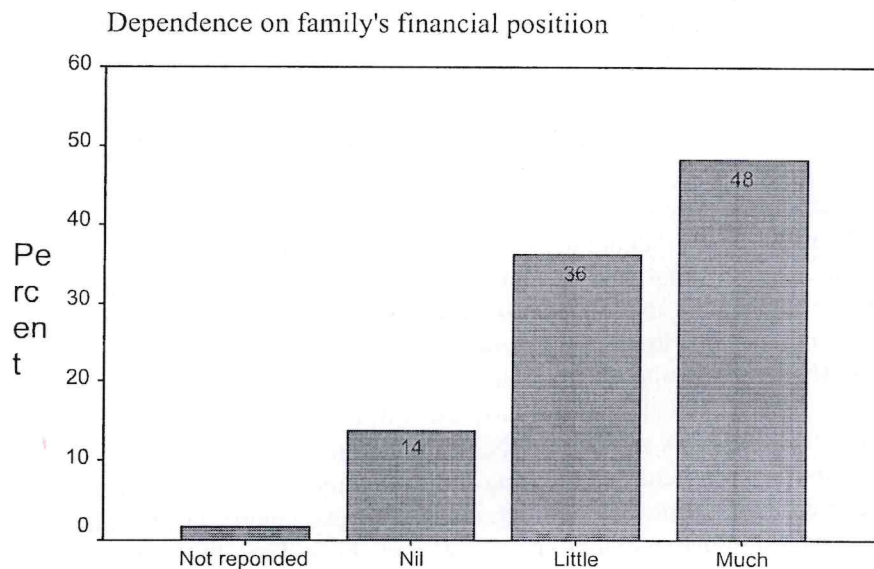
Financial position of family

The last factor which had an influence on the future plans was their families financial position, and it was observed that nearly half of the students said that their future plans, thatis, education, employment or entrepreneurship,are influenced by the financial position of the family, a lower family income discouraged education and encouraged employment.

Section B - Overall analysis
The above figures (5 to 14) can be broadly classified into two main factors, the macro factors which are not within the immediate vicinity of the students include,
   Fig. 8 - General Public opinion,

Fig. 10 - Changes in career trends

Fig. 11 - Content and orientation of the education system

Fig. 12 - Changes in economic trends

All these factors have little or no influence on the student's future plans as theycollectively show that they have less than 35 percent influence on the students on average.

The remaining six factors can be classified into micro factors as they are within the immediate periphery of the student's own environment, and they include.

Fig. 5 - dependence on course performance

Fig. 6 - dependences on family members

Fig. 7 - dependences on the advice of elders and teachers

Fig. 9 - Influence of friends

Fig.13 - My analysis and decision

Fig.14 - Family's financial position

Among the micro factors, four factors, namely own analysis and decision, course performance, the influence of family and advice of elders and teachers, score a very strong influence on students future plans crossing sixty percent in all the cases, and the remaining two factors that is the influence of friends and the family's financial position are also in a range of 45 percent.

When the average influence of these micro factors was taken it was found that the influence of these factors on the future plans of students was nearly sixty percent.

We then ran the large sample test of the difference in proportion between macro and micro factors

H0: There is no significant difference between the proportion of students who are impacted by macro factors and micro factors in their future plans and career choice

Using the large sample test for difference in proportion mentioned in the tools and techniques, The test value is $Z= 4.77$ which is higher than the table value of 1.96.

Therefore, there is a significant difference between the influence of micro and macro factors on students' future plans and career choices.

Findings and suggestions

1. It was found in the research that many students want to take up further education after their undergraduate studiesthat is nearly 69 %, which calls for better sensitization to the options available at the postgraduate level. Therefore there must be a sincere effort to acquaint students with the courses available at the post-graduate level and also specializations available must be brought to the notice of the student at their final year of study so that they can make an informed decision

2. The research paper also found that nearly 19 % or one out of five students are confused as to what they have to do after their UG education. Therefore educational institutions, and nonprofitorganizations in consultation with the industry and professional organizations must conduct career workshops in the UG level and also carry out aptitude and interest tests so that students have a clear idea of their career options andtake up their future plans with confidence.

3. Theresearch also found that there is a growing trend of students taking up further education in post-graduate management courses or MBA, which shows that even engineering students feel it necessary to have some business and management knowledge and skills. Therefore it is suggested that it would be worthwhile to try out practically oriented management skill development programs at the undergraduate level for all streams so that students do not feeltheir education as incomplete at their graduate level.

4. Among those students who do not want to take up further education, it was noticed that a majority ofthem, that is 63 % want to take up employment. In comparison,only 10 % want to start their own enterprise, which suggestsa low-risk appetite toward entrepreneurship. Therefore, it is necessary to make students take up mini-entrepreneurial ventures at the UG level todevelop a taste for entrepreneurship and later become job providers rather than job seekers.

5. Among the factors which affect the choice of career, it was found that the strongest influence was the student's own research and analysis, around 73 percent. Therefore, it is the responsibility of government institutions, media groups, and colleges to see that proper and accurate information is given to the student to make the right choice.

6. Another essential factor that influenced future planswas the advice of elders and teachers,nearly 66 %. Therefore, it is the duty and responsibility of teachers at the undergraduate level to alwaysgive an informed choice to the students afterdoing thorough research on the available career choices. Itwill be a great help if teachers undergo training in career counseling.
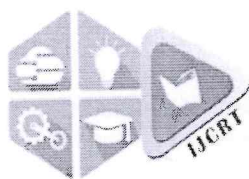
Conclusion

A student's most important decision is their career and future plan, as he or they will spend the rest of his life in the occupation he chooses or the vocation related to his post-graduate studies. Therefore the societyand the country's future direction is made in these few years of undergraduate education.

Both micro and macro factors affect such choices, and if care is taken to guide students in this delicate phase of their life, it can impact the future of the students in particular and the future of the country in general.

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Lessons From The Past For Creating A Strong Future

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Abstract: Indian ancient heritage is full of treasure holds significance in the present scenario. India's ancient knowledge system was based on achieving higher self through holy spiritual knowledge. The biggest gift given by India to the World is Holy Bhagavad Gita, Ramayana and Mahabharat which provides comprehensive knowledge relevant in practical life. The spiritual philosophy given in different aspects of ancient Indian heritage were highlighted worldwide. In light of this, the present study is an attempt to understand the lessons for corporate problems from Bhagavad Gita, Ramayana and Mahabharat. The study was based on secondary data. The study concluded that lessons provided by Bhagavad Gita, Ramayana and Mahabharat are useful for corporates in increasing their efficiency and effectiveness which leads to growth of the company as a whole

Keywords - ancient heritage, corporate lessons, Bhagawad Gita, Ramayana, Mahabharath

INTRODUCTION

Indian civilisation has given good sized importance to understanding — its amazingly extensive frame of intellectual texts, the sector's biggest series of manuscripts, its attested tradition of texts, thinkers, and faculties in such a lot of domains of expertise. In Bhagavad Gita, Lord Krishna tells Arjuna that know-how is the brilliant cleanser and liberator of the self. India's knowledge device is historic and uninterrupted just like the glide of the river Ganga, from the Vedas (Upanishads) to Sri Aurobindo. information has been on the centre of all inquiry.

Vedic philosophy constituted of 4 vedas viz. Rig veda, Yajur veda, Sama veda and Atharvana veda. Rig veda came into life earlier than other vedas, which includes 1028 hymns which have been sung in order to worship God. Yajur veda affords the guidelines to be taken into consideration for the time being of sacrifice. Sama veda charges chanting at some stage in the length of sacrifice. Atharvana veda suggests rituals. The Dharma Sastras cites the policies to be located inside the ordinary existence. Six Vedangas viz., Shiksha, Kalpa, Vyakarna, Nirukta, Chhanda, and Jyotisha, also maintain extensive vicinity in the Indian understanding system. Indian know-how machine also includes knowledge acquired from Upanishads, Mahabharta, Ramayana, Puranas, Brahmanas and Aranyakas. The Upanishads includes philosophical textual content associated with exclusive regions just like the advent of world, absolutely the, the soul, and the thriller of nature.

The complete body of organised understanding is split into two sets inside the Mundakopanisad — para vidya and apara vidya, knowledge of the final precept, paramatma or Brahman i.e. the metaphysical area, and understanding that is secondary to how one grasps aksara-Brahman i.e. worldly understanding. For that reason, a difference is made between jnana and vijnana, the know-how of records of the perceptible international. Over time, information of various domain names has been institutionalised into disciplines, or vidya and crafts, or kala. Indian disciplinary formations encompass fields as diverse as philosophy, structure, grammar, arithmetic, astronomy, metrics, sociology, economic system and polity, ethics, geography, logic, army technology, weaponry, agriculture, mining, exchange and commerce, metallurgy, mining, shipbuilding, medicine, poetics, biology, and veterinary technology. In every of these, a continuous and cumulative collection of texts is still available regardless of the vast loss and historically recorded destruction.

India's knowledge machine includes instinct, enjoy and revelation. India's understanding gadget provides a variety of guidance in accomplishing positive sports inside the corporation extra efficiently. On may sixteenth 2022 Hon'ble Union Minister of education and ability development Shri Dharmendra Pradhan released a ebook on "advent to Indian know-how gadget: standards and application". He pointed out the recognition of India's knowledge system, spirituality, way of life and philosophy globally. He also emphasised the advantageous impact of India's expertise system on the world. He further spoke about Indian texts Vedas, Upanishads and so on. And designated that there may be a need to safeguard, document and spread the know-how our Indian know-how system which is complete of treasure around the arena. He additionally highlighted the significance of technological know-how-primarily based understanding contained in India's knowledge machine within the modern time. Further, he stated that there may be a want to expand a co-operative dating among Indian understanding gadget and current troubles that's confronted by using society as our Indian understanding machine has solution for global's proble...

Management is appeared as one of the leader fa... ...evement of the business enterprise as this issue will lead the employer to new heights, glorious function ... whereas the identical organisation will see failure if

life. With a purpose to create a sustainable employer lifestyle, variety of management theories offers a proof of this concept from diverse aspects. Indian historic Puranas and Scriptures like Mahabharta, Ramayana, Vedas, Bhagawad Gita, and Arthashastra etc., gives a completely unique outlook of management and its consequence at the company.

Now a days lot of managers even after taking training are facing lot of issues in terms of management of stress, managing employees around them, how to increase their work productivity, making leaders in higher level management, managing work environment, creation of friendly relations and building organization which will have a long productive life. They also face difficulty in managing their work life and personal life. Because of this situation, there is a need to find out the better alternatives for the management of the organization.

LITERATURE REVIEW

Satish, M., & et. al. (2020) studied leadership lessons from Indian Knowledge System. The study used secondary data which was collected from published sources. The paper discussed leadership lessons from mainly Mahabharat, Ramayan and Bhagawad Gita. The study also made an attempt to compare contemporary management approach with ancient Indian Knowledge System. The study concluded that ancient Indian Knowledge System holds prominent place in facing challenges of contemporary corporate world.

Rajpurohit, N. (2020) analyzed different leadership styles in ancient scripture Mahabharata and its relevance to motivate and demotivate employees. The study used secondary data which was gathered from authentic sources. The study also mentioned the leadership role of Lord Krishna which helped Pandavas in attaining victory over Kaurvas. The study also mentioned example of bad leadership by quoting the case of Lord Dhritarashtra.

Gupta, P., & Singh, N. (2019) examined different management lessons from Ramayan and Mahabharat that can escalate the managerial efficiency. The study was based on secondary data collected from published sources. The study mentioned some managerial models which were based on the two great Indian epics Ramayan and Mahabharat. It was concluded that Lord Shri Ram in Ramayan and Pandavas in Mahabharat had used a combination of modern management strategies like Red Ocean, Blue Ocean, Green Ocean and sometimes Black Ocean too at right time.

Priya, S. E., & Vivek, N. (2015) deliberated various management concepts from Mahabharat which are significant in managing modern day corporate world. Secondary data was used for the study. Some stories of Mahabharat which holds significance in management of company were discussed the study.

Mahadevan, B. (2008) made a study on management lessons from Bhagawad Gita using secondary data. He discussed alternative examples from Bhagawad Gita and stated leadership and management lessons from Bhagawad Gita.

OBJECTIVES OF THE STUDY

The objective of the study is to analyse and understand the corporate lessons from Bhagawad Gita, Ramayana and Mahabharat.

METHODOLOGY OF THE STUDY

The study is descriptive in nature. Secondary data collected from published sources used in the study.

ANALYSIS AND DISCUSSIONS

Indian Knowledge System is considered as one of the biggest sources of knowledge and motivation in the modern times as well around the world. Different aspects of Indian Knowledge System have been encouraged and welcomed by citizens worldwide. It provides assistance to people in finding their purpose of life and provides a path in the direction to attain that purpose. Bhagawad Gita, Ramayana and Mahabharata are the ancient Mythologies which provides the solutions to the everyday management problems

Bhagawad Gita is regarded as a comprehensive guide to increase the productivity of employees in terms of their efficiency and effectiveness in performing a job by spreading wisdom in terms of converting weakness into strength, dividing responsibilities, choosing the appropriate individuals in the team, the requirement of charismatic leader in the organization that will inspire, motivate and will help the employees of the organization in solving certain dilemmas they face every day. Ramayana one of the greatest epics of Hindu Mythology clearly shows the application of management principles. Mahabharat one of the biggest, oldest and great epic of Hindu mythology provides life skills, knowledge and wisdom which India has offered to the world.

CORPORATE LESSONS FROM BHAGAWAD GITA

- **Commitment with regard to work:** A famous stanza of Bhagawad Gita provided guidance with regard to detachment of expectations of desired results from completing any work commitments. Likewise, a person ought to deal with completing the work within the stipulated term without specializing in favoured results.
- **Unselfish Work Commitments:** Lord Krishna enlightened Arjuna to brawl a fight with the intention to improve the universe. Lord Krishna advice Arjuna that the principle goal of struggle is to improve the universe within the route of correct manner of dwelling (Dharma), no longer for satisfying their very own greed, benefit and desire. Therefore, each and every single character of the organization must deliver first choice to organization objective in place of character's objective.
- **Identity with Work:** According to Bhagawad Gita, an individual's identity is not decided by his caste, colour and family he is member of, but an individual's personality must be related to his ability to fulfil his work commitment effectively and efficiently. Therefore, in the light of management, it means that a person's identity must be decided and related with his skills, capabilities, work etiquette and way of acting towards superior and subordinates.
- **Emotional Intellectual Capacity:** Bhagawad Gita advice that one should not get cocksure of one's little victory and not to get dishearten of small failures, but one should constantly take efforts in the direction of our purpose. Consequently,

in the context of management, individuals of the organization should work in the direction of organization's objective without giving regard to all odd.

- **Support to change:** Lord Krishna said that an individual afraid of change divert his own mind towards doing wrong course of action (Dharma) and unethical practices. Similarly, people working in the management should not be afraid of any fear and should be ready to accept any change in working conditions.
- **Purpose:** Lord Krishna advised that any work done with favourable intentions will definitely give desired results. Similarly, the objective of organization's manager should be clear, conscience and attainable.
- **Sound Cognitive Ability:** During the war, Lord Krishna said that life of a human is a war between the body and the mind, one must strike to keep a balance between mind and body in order to examine a situation and take right decision at the right time. Consequently, an organization's manager should keep his mind stable in order to take effective decisions in important situations.

CORPORATE LESSONS FROM RAMAYANA

- **Doing SWOC analysis:** SWOC (Strength, Weakness, Opportunities & Challenges) analysis plays a vital role in modern day management. As per the established norms of management, before entering into any job, we do a complete analysis of the situation and then get mentally prepared and then make a plan, analyse competitor's SWOC and then act accordingly. In Ramayana when Hanuman entered Lanka; the first thing he did was a complete study of the Lankans and assessing their strengths, weakness, challenges & opportunities.
- **Focusing on the importance of communication in constraints:** A lack of communication generally causes loss of focus and direction. On the contrary, continuous guidance and direction through effective communication helps subordinates to march towards the predetermined goals of the organization. This needs to be followed in congenial as well as adverse situation too. This was evidently observed in the kidnapping journey of Sita by Ravana when she purposefully dropped her belongings and jewellery at the regular intervals throughout the journey which gave Lord Rama the indication of the right path.
- **Believing & valuing your subordinates:** In the corporate world, a manager is the one who can get his work done even from the competitors. A manager pins your ears back to what his subordinates has to say and tries to hold onto them together especially when the organization needs them the most. In Ramayana, Ravana has time and again shown the signs of a bad manager, and hence it led to the demise of his kingdom. Right from the beginning, he ignored the advice of his managers and got his kingdom in the state of war with Lord Ram. His mismanagement and the act of not valuing his subordinates resulted in Vibhishan (one of the wisest manager) leaving him in the middle of a crisis.
- **Having a clear Vision:** It's miles required that every leader must have a clear vision of what he's aiming for and what fruit will it bear him in future. As an instance, Rama's clear imaginative and prescient changed into to launch his wife Sita and rout the evil forces. This readability about the intentions in addition to the system enabled his navy to place its heart and soul inside the battle to release Sita. So, a clean vision will usually be a motivating component to awareness on the aim and to no longer get deviated.
- **Stand fearlessly in spite of challenging situation:** After the kidnap of Sita, Ram curiously go searching in the forest on the lookout for Sita. Ramayana confirmed very poignant info of Ram's sorrow whilst Sita was kidnapped with the aid of Ravana. But still, he by no means ger disheartened and his sorrow did no longer permit him prevent the hunt of Sita even when he doesn't realize approximately the kidnapper of Sita. Lord Ram searched for Sita courageously and even encouraged his navy to discover Sita and as a result, he won the conflict in opposition to Ravana. Face disaster situation with courage and take vital steps at that time to gain favored desires.
- **Leaving your comfort zone:** It's been discovered that advertising managers of nowadays who travel through the vicinity to get a higher first-hand experience of the consumer's pulse do a miles better activity of servicing the marketplace. In Ramayana, while Rama receives ordered to remain in the jungle for a period of fourteen years, Sita and Rama take it as an possibility to interact with the ordinary residents of their monarchy, instead of last limited to the contentment of their palace. This helps them to recognize the ground realities better.
- **Having a clear Succession Plan:** A well-run organization ensures that the career development plans of its high performers are directly linked to succession planning. Therefore, good managers should go to great lengths to develop the managers who report to them and make them aware of their succession planning. For example, despite the chaos in Dosalata's preparations to place Rama on the throne of Ayodhya, we can never deny the existence of an easy succession plan. In principle, it aims to ensure consistency in governance. Besides being the eldest son, it helps; Rama is loved by all, and thus chosen to lead the kingdom to Dasara. According to Raghuvansham of Kalidasa, when surrendering his body, Rama divided it fairly among his two sons - Lava and Kusha.
- **Act in accordance with ethical code of conduct:** Rama took moral decisions in each and every aspect of his life.
- **Behave with all individuals equally:** Lord Ram was a King and he behaved with all the individuals equally. Rama unlike other kings maintained a very healthy and equal relationship with people of both upper and lower caste. This also helps him to win war against Ravana as he received loyalty of its army. Maintaining healthy relationships and treating all people with respect and kindness regardless of their caste.

CORPORATE LESSONS FROM MAHABHARAT

- **Innovative Thinking:** There are 100 Kauravas. They do not occur naturally, but are made using test-tube technology. It is said that Duryodhan was the world's first test-tube baby. There were no laboratories back then. This is done with the help of clay pots. Clay pots provide the temperature the embryos need to grow and act as test tubes. It is basically an invention, but the result of innovative thinking. Gandhari wanted to have more sons and hoped to lay the foundations of a stronger kingdom. Creating a brand name is easy when starting a business and launching an innovative new product or service.

- **Selection of Resources:** When the battle was going to begin, most of the other armies were also involved by the Kauravas and the Pandavas; Arjun and Duryodhan went to ask for favours from king Krishna also. Arjun asked Krishna himself to work as the driver of his Chariot. On the other hand, Duryodhan asked for his army. Krishna and his leadership with the Pandavas were one of the major reasons behind the victory of the Pandavas. He guided them at every step. He played the role of the most important human resource. When it comes to management, it is very necessary to select the right resources. Resources are not only raw material and other non-living things, but employees are also human resources. The selection of the right resources is therefore significant.

- **Following the Learning of Management Books:** Before the beginning of the battle, Arjun lost his confidence and passion to win the battle because of the presence of relatives against him. He was not willing to fight against them. Lord Krishna gave an insight into the realities of life with the help of Shrimad Bhagawad Gita. It is believed to be the solution to all the problems in the world. The solution to all the problems related to the challenges can be easily found in the most valuable management books. It is important for all the managers to understand the importance of the learnings of Management and to follow them.

- **Ethics:** Kauravas always walk the path of dishonesty. They restored the game with the help of their uncle Shakuni. When the battle took place, they killed the son of Pandavas at night. At that time, it was strictly forbidden to attack others at night, because the fighting time was during the day. On the other hand, the Pandava family has followed ethical principles since birth. They play the game honestly. The Pandavas lost everything in the game, gave everything to the Korawas, and went to exile in the forest by themselves. Even though they knew the punishment was immoral, they took it anyway. So they came back and asked for their kingdom back, but Duryodhan refused, so Mahabharat happened. A company that does not follow an ethical path cannot survive in the long run.

- **Commitment:** Most of the leaders like Bhishma Pitamah and Dronacharya fought on behalf of the Kauravas even when they knew that they would lose the battle and their lives. They had their chances of disrespecting the kingdom of Hastinapur which was under the Kauravas and moving to the Pandavas but they did not. This is a management lesson because it should be followed by all the employees that they should not keep hopping from one company to another for a little increment in the salary. They should remain loyal to a company if they find the work culture suitable. None of the fighters from the Kauravas cheated, this also teaches the management lesson of being loyal to the customer and the company.

- **More people, more work:** Sometimes companies tend to lay off workers to maximize profits. However, when value is created for the greatest number of people, there is a greater chance of success and building a good brand image through word of mouth, as employees and their families are effortlessly loyal customers of the company. The Kauravas and Pandavas understand the importance of manpower and try to increase their armies as much as possible.

- **Diplomacy:** Dronacharya was the teacher of the Kauravas and Pandavas. He was extremely powerful and knowledgeable. It was necessary for the Pandavas to kill him to make the Kauravas weak. He made an oath that he would discontinue fighting if he lost his son Ashwathama. The Pandavas played a trick by spreading the rumor that Ashvathama had died. Since Dronacharya was very intelligent, he sensed the trick and therefore decided to ask Yudhisthir because Yudhishthir was the most righteous among all the Pandavas who was determined to not speak a lie ever in his life. However, the Pandavas had to kill Dronacharya; Yudhishthir answered for an elephant named Ashwathama who was killed by Bheem His answer was- 'Ashwathama has died'. This is how Yudhishthir spoke to Dronacharya diplomatically without speaking a lie and Dronacharya was killed. Diplomacy plays an important role in getting products sold. It is an important part of marketing communication and influencing customers through advertisements. It is the art of presentation to appeal to the customers.

- **Women Empowerment:** Empowering women is one of the most important management lessons to be learned in the Mahabharata. The sheer misconduct of Draupadi became the basis of Mahabharat. Respect for women should be instilled in future generations through struggle. After years of ignorance, fair sex is now recognized as an essential part of society and the corporate world. Many companies have ensured that 50% of employees in all positions are women. Mahabharata taught the same thing long ago!

- **Division of Work:** Mahabharata is an excellent illustration of the principle of division of work. Bheema, the strongest of all the Pandavas, with the power of a hundred mammoths; killed all the hundred Kauravas alone with his strength. Nakul was given the part of aiding Bheem. He also played a prominent part in healing the injuries of the Kauravas because of his command over Ayurved. He also killed the two sons of Karan, the dearest friend of Duryodhan. Sahadev defeated 40 sisters of Duryodhana. Sahadev was an expert with brands who killed Shakuni. Shakuni was the architect of the bones game. Arjun was a great legionnaire and the stylish sportswoman of the world and he killed Bhishma Pitamah, Jaydrath, and numerous other fighters of the Kauravas. Arjun named Krishna to come his motorist so that he could be guided at every point of time. Shikhandi, stood before Bheeshma to shield Arjun because Bhishma had taken a pledge to no way raise his munitions against women and a eunuch wasn't believed to be a man according to the morals of society at the time. Yudhishthir was the king after the battle and he was responsible for twisting colourful rules so that the palm of the ethics took place. He was excellent in shaft fighting and he killed Shalya and his family on the 18th day of the battle. Shalya was his uncle and the commander- in- chief of the Kauravas. This is how it's important to give the right work to the workers according to their chops and gift.

- **Team Spirit:** This aspect is the pillar of the Mahabharta. Kauravas could not muster up the complete support that was necessary for winning the battle. All the great generals of Kauravas, including Bheesma, Drona, Karna crusaded

individual fights on the battlefield. However, Pandavas weaved one team that was directed by a single goal. All participated in decision making process and contributed their skills leading to a synergic effect.

- **Excellence in Governance:** When Indrapastha (City of Indra) was erected, Pandavas ruled in a fair and just manner. They didn't drift from the path of righteousness. There administration and operation won the love and affection of their subjects. They ruled for thirty- six times on this path before falling prey to an illegal game of bones. It was this excellence in governance that ultimately got lost and led to a heinous battle in Kurukshetra. At present, Excellence in governance is a vital condition for a business leader to command respect in the business and among their workers. It's vital for maintaining a healthy culture in the associations and vent off the malignancy of office politics and other expiring aspects that types negativity. The HR department can insure that certain enterprise taken by association to insure a culture of excellence in governance.

CONCLUSION

Indian ancient heritage is full of treasure holds significance in the present scenario too. Corporate learnings that can be acquired mainly from Bhagawad Gita, Ramayana, and Mahabharat provides useful solutions to face contemporary challenging situations of corporate world. They are very useful for corporate people as it provides them an aid in increasing their competency, skills and helps them in facing the problems. Implementation of these lessons can help corporates to increase their efficiency and effectiveness which in turn leads to growth of the company.

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"A STUDY ON QUALITY SERVICES AT PRIVATE HOSPITALS IN BANGALORE"

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Abstract:

Hospitals vary among nations, and each nation's socioeconomic and political conditions have an impact on the particulars of these systems. Although there are many different types of provisioning, there are typically three primary types. First, there are countries where private interests coexist in the form of individual practices, hospitals, and other related services while the government is extensively involved in the financing, delivery, and management of services. Second, in some countries, only the government and no private interests are permitted to provide healthcare. Thirdly, there are countries where the majority of services are provided by the market. Hospital Services is a requirement in different nations, and the extent and kind of such services are determined by the socioeconomic and political norms of a particular culture. A general classification of government engagement into three categories, namely regulatory, supporting, and restricted role, may be done even if the form of government involvement in health care varies from simple regulator to service provider from nation to country. In the event of a regulatory framework, which is common in many nations, the government's participation is limited to formulating the laws and rules controlling the industry, however in the case of a supporting role, the government only gets involved to a limited degree and private interests are permitted in both scenarios. In certain nations that adhere to the third model, the state is solely responsible for delivering healthcare to its citizens, and no commercial interests are permitted. However, no comprehensive research was carried out in Bangalore District to evaluate the level of services provided by private hospitals. The survey would give hospital administrators insight into how patients and their companions rate the standard of care in regard to every aspect The paper attempts to answer many such problems in Bangalore so that such services equip quality.

Key words: etc. Hospitals, Socioeconomic and political norms, Quality

Introduction: The creation of the East India Company in the seventeenth century, which led to the permanent employment of European physicians in India, is credited with giving rise to private practice. Initially, the firm hired British physicians who were referred to be "surgeons," mostly for ships headed to India. Later, the merchants made a particular request for certain physicians to stay in India. The East India Company began recruiting physicians to treat their resident European personnel by the late seventeenth century, when surgeons had already been employed. The East India Company began providing medical care for its workers.

Indigenous medical practices like Ayurveda, Unani, and Siddha were mostly the purview of lone practitioners in India, who charged fees that were typically paid in kind. During the nineteenth century, kings depended on Ayurveda practices. The majority of the populace paid various healers and relied on them for their services. The state's involvement in taking on the duty of serving the people was modest.

In order to safeguard and care for the East India Company personnel, the British adopted allopathic medicine in the late eighteenth century. The network of hospitals and clinics in different presidencies was subsequently enlarged as they eventually offered similar services to the Indian people as well. The British invested in medical education in the late 19th century to train support employees who would work in the newly built facilities since the development of medical care facilities required qualified personnel. While providing subordinate personnel was the primary goal of medical education, several of these institutes also accepted private students. These private students were in direct competition with European doctors for the private market as early as the 1880s, when they opened private practices in significant towns. In this way, private health care has been subject to competition since 1980. By the turn of the century, many graduates had established their own private

practices in the major cities. They removed patients from government hospitals and clinics, as well as from hakims (practitioners of Unani medicine) and Vaid's (practitioners of Ayurveda medicine). India has one of the lowest public health spending rates in the world (about 1% of GDP), but one of the highest private spending rates. According to the NSSO, 5-6% of Indian households' consumption expenditures go toward health. The expense of private sector services renders them expensive for the underprivileged and impoverished. The population's use of public health facilities for outpatient and inpatient care has not increased despite a steady rise in the infrastructure supporting public health care. The NSSO (1986– 2004) statistics blatantly demonstrate a significant drop in the inpatient use of public health facilities and a comparable rise in the use of the same by private health care providers in both rural and urban regions.

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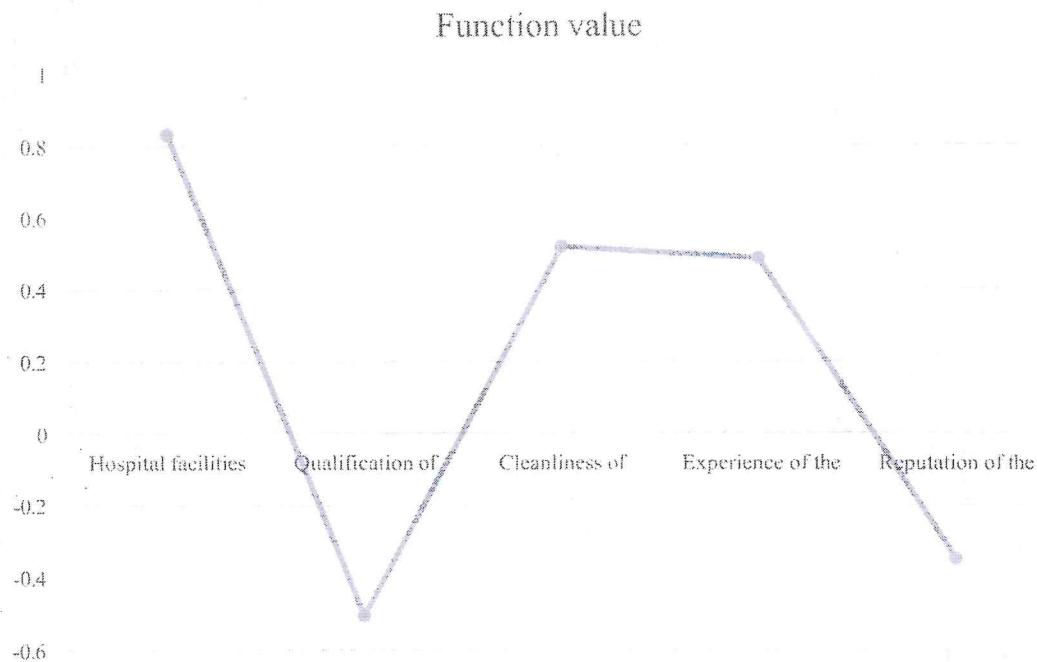
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Dissatisfied (Group-1%)	95	115	210
Satisfied (Group-2%)	190	100	290

Standardized Canonical Discriminant Function Coefficients

Variables	Function value
Hospital facilities	0.831
Qualification of doctors	-0.506
Cleanliness of hospital	0.518
Experience of the doctors	0.486
Reputation of the hospital	-0.347

Function value

For developing this model, 17 independent variables were selected. Out of those variables only 5 variables were identified as relatively more important than others.

Q. No.	Factors affecting selection of hospital	Least Preferred (%)	Not Preferred (%)	Neutral (%)	Preferred (%)	Most Preferred (%)
5	The hospital is recommendation by others.	1	2	3.7	8	75.1
8	The hospital gives extra facilities like canteen, pharmacy store and phone is easily available.	2	5.5	3.8	7.5	71.1
10	The hospital has excellent Troma/ Emergency services.	5.5	4.7	2.5	10.1	76.3
15	The hospital gives food and accommodation to the patients' relative.	4.4	4.4	6.4	15.9	88.8
11	The hospital is recommended by other doctors.	4.34	2.5	2.9	24.7	52.4

Table shows various preferences for factors affecting selection of hospital. Majority (96.1 per cent) of the respondents preferred hospital with well qualified doctors whereas 94.6 per cent preferred reputation of the hospital and 93.6 per cent preferred experience of the doctors in the hospital. Other factors which were affected the selection of hospital by selected respondents were easy payment system, location, good ambience, cleanliness, providing accurate and true information regarding status of patient and proper guidance and diagnosis, fast facilities. Some respondents preferred to take decision on the basis of the suggestions given by family doctors, friends, relatives or neighbors.

Need for best treatment with respect to Gender

Preference	Gender		Total
	Male	Female	
Most Important	74	65	139
Important	86	71	157
Neutral	95	84	179
Least Important	19	2	21
Not Important at all	2	2	4
Total	276	224	500

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Q. No.	Factors affecting selection of hospital	Least Preferred (%)	Not Preferred (%)	Neutral (%)	Preferred (%)	Most Preferred (%)
1	Doctors of the hospital are qualified.	0.4	0	1.5	2	96.1
3	Reputation of the hospital.	0.5	1.6	0.5	4	94.6
2	Doctors are experienced	0.4	1	2	4	93.6
17	The hospital offers easy payment system.	1	0.5	0	6.4	92.
9	The hospital is located in nearby area.	0	2.6	2	4.9	91.5
7	The hospital has good ambience	0.7	2	3	4.5	89.9
16	The hospital is neat and tidy.	0	0.5	2.5	7.5	89.4
13	The doctors of the hospital give accurate and true information every time.	0.5	0.3	1.5	8.6	89
4	The hospital has facilities. (Equipment, Infrastructure etc.)	0	1	2.7	6.8	89.7
6	The doctors give proper guidance and diagnosis.	0	1.4	0.5	9.5	98.7
14	The hospital gives one click access facilities (Laboratory for tests are available in hospital) is being provided by the hospital.	0	0.5	2.6	9	78
12	The hospitals provide facilities to patients like rooms, stretchers, wheelchair, and food.	1.5	1.5	3	6.4	86.7

CONCLUSION:

The study on the influence of branding on consumer buying behavior has elucidated several critical insights. It has unequivocally demonstrated that branding significantly impacts consumers' purchase decisions, with a particular emphasis on brand image, loyalty, and perceived quality influencing consumer preferences. Brands that cultivate a strong, positive image and foster loyalty through consistent quality and engagement strategies tend to command greater influence over buying behaviors. Additionally, the study highlights the importance of understanding consumer perceptions and the role of emotional connection in brand preference and loyalty. Marketers must prioritize these aspects, tailoring strategies to enhance brand perception and deepen consumer relationships. The findings suggest a compelling need for brands to invest in building and maintaining a positive brand image, emphasizing quality and engaging consumers meaningly. This approach not only influences purchase decisions but also promotes long-term loyalty, securing a competitive advantage in the market.

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JAYASHREE TAMBAD, Associate Professor & HOD, Department of Commerce, Sindhi College, Bangalore.
SAVITHA N.L, POOJA D, Assistant Professor, Department of Commerce, Sindhi College, Bangalore.

Abstract:
Hospitals vary among nations, and each nation's socioeconomic and political conditions have an impact on the particulars of these systems. Although there are many different types of provisioning, there are typically three primary types. First, there are countries where private interests coexist in the form of individual practices, hospitals, and other related services while the government is extensively involved in the financing, delivery, and management of services. Second, in some countries, only the government and no private interests are permitted to provide healthcare. Thirdly, there are countries where the majority of services are provided by the market. Hospital Services is a requirement in different nations, and the extent and kind of such services are determined by the socioeconomic and political norms of a particular culture. A general classification of government engagement into three categories, namely regulatory, supporting, and restricted role, may be done even if the form of government involvement in health care varies from simple regulator to service provider from nation to country. In the event of a regulatory framework, which is common in many nations, the government's participation is limited to formulating the laws and rules controlling the industry, however in the case of a supporting role, the government only gets involved to a limited degree and private interests are permitted in both scenarios. In certain nations that adhere to the third model, the state is solely responsible for delivering healthcare to its citizens, and no commercial interests are permitted. However, no comprehensive research was carried out in Bangalore District to evaluate the level of services provided by private hospitals. The survey would give hospital administrators insight into how patients and their companions rate the standard of care in regard to every aspect. The paper attempts to answer many such problems in Bangalore so that such services equip quality.
Key words: etc. Hospitals, Socioeconomic and political norms, Quality

Introduction: The creation of the East India Company in the seventeenth century, which led to the permanent employment of European physicians in India, is credited with giving rise to private practice. Initially, the firm hired British physicians who were referred to be "surgeons," mostly for ships headed to India. Later, the merchants made a particular request for certain physicians to stay in India. The East India Company began recruiting physicians to treat their resident European personnel by the late seventeenth century, when surgeons had already been employed. The East India Company began providing medical care for its workers.

Indigenous medical practices like Ayurveda, Unani, and Siddha were mostly the purview of lone practitioners in India, who charged fees that were typically paid in kind. During the nineteenth century, kings depended on Ayurveda practices. The majority of the populace paid various healers and relied on them for their services. The state's involvement in taking on the duty of serving the people was modest.

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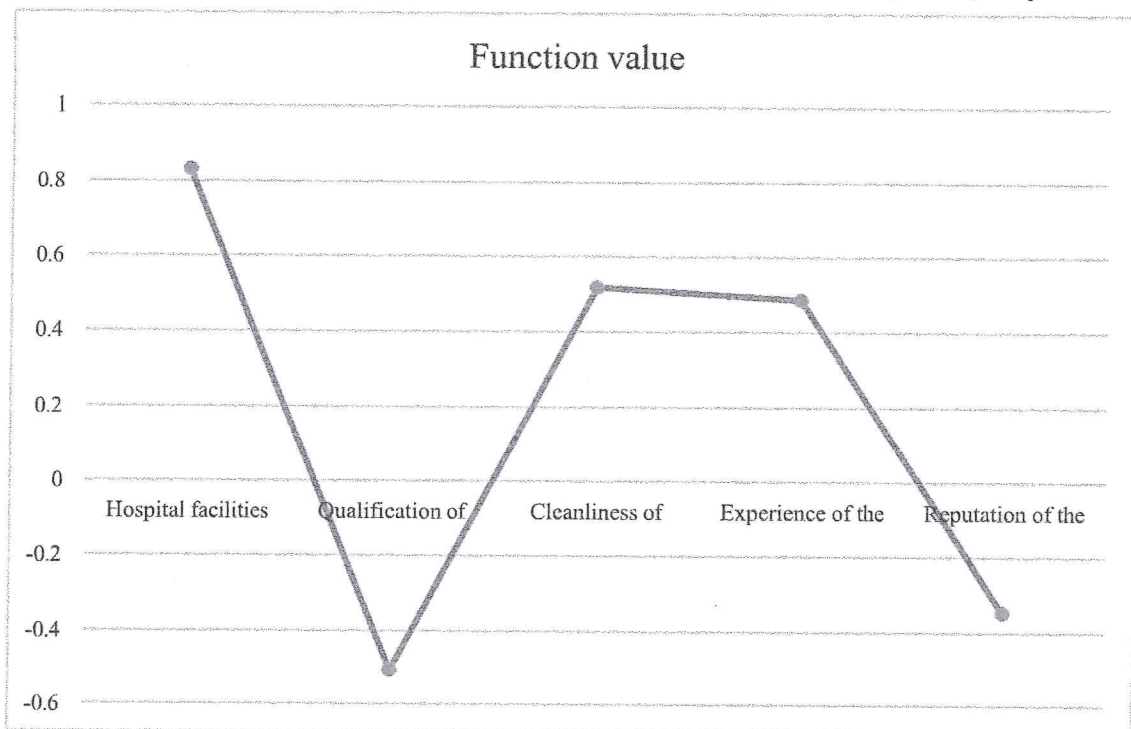2.   Most of the data is collected through information given by the patients which are subject to bias.

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Chart- Need for best treatment with respect to Gender

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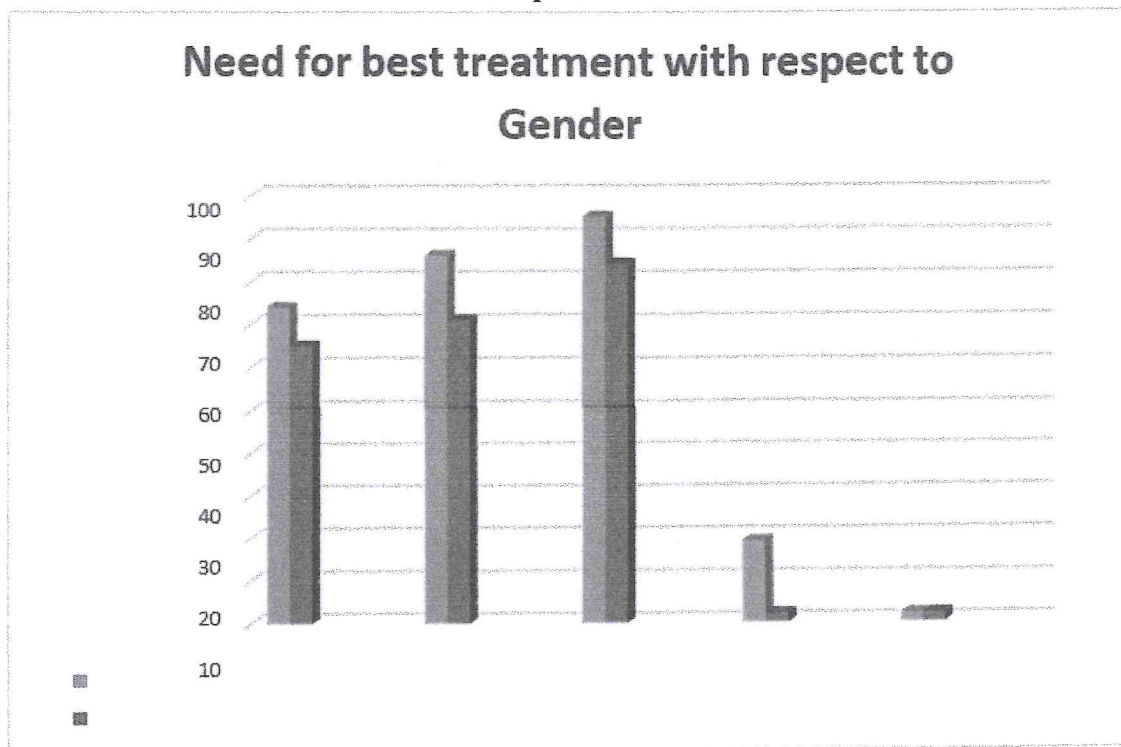
Out of 500 respondents, 139 (36.87 per cent) felt that best treatment was the most important for them whereas 1 (1.0 per cent) gave it least preference.

Conclusion: Quality Services are the advantage are the greatest challenges confronted by Private health sectors. Increase in the number of Private hospitals has created a challenge for the private hospitals to sustain in the market. Adoption of creative marketing strategies may enable sustainability. It would be ideal to devise the marketing strategies based on the expectations of Customers. Appropriate marketing strategies adopted by Private hospitals enable to attain the objectives of the organization. They also help in leveraging the strengths and minimizing the weaknesses.

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अनुसन्धान-प्रकाशन-विभागीया त्रैमासिकी शोध-पत्रिका

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कुलपतिः

सम्पादकः
प्रो.शिवशङ्करमिश्रः

सहसम्पादकः
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शोधविभागाध्यक्षः

सहसम्पादकः

डॉ. ज्ञानधरपाठकः
शोधसहायकः

CONTENTS

A STUDY ON RATING OF PSB'S (VS) PVB'S USING CAMELS RATING MODEL- RATIOS

Mr. V. Sri Hari Research Scholar, Bharathiar University, Coimbatore, T. N, & Associate Professor & Placement Co-ordinator, Dept. of Commerce & Management, SINDHI COLLEGE, Bangalore.

Dr Sreenivas D.L Research Guide, Bharathiar University and Professor, Dept. of MBA, Sindhi Institute of Management

Prof. Jayashree Tambad Associate Professor & HOD, Dept. of Commerce & Management, SINDHI COLLEGE, Bangalore

ABSTRACT

Indian Banking Industry is undergoing Banking reforms since implementation of BASEL Norms. In recent years the banking business is highly competitive and many issues in NPA's. The STUDY highlights on analysis and interpretation using secondary data using CAMELS Rating model with the usage of ratios. The Data analysis to study operations of banking transactions and customer satisfaction level of PSB'S and PVB'S. The article is an attempt in recent years. How far the commercial banks can withstand this competition and survive in years to come in-their banking operations? This study has been successful in understanding the outcomes of secondary data by quoting qualitative and quantitative analysis Performance and Position of Commercial banks.

KEY WORDS: Public Sector Banks, Private Sector Bank, Banking Reforms.

INTRODUCTION

The CAMELS ratings or Camels rating is a supervisory rating system originally developed in the 6 Source: RBI U.S. to classify a bank's overall condition. It's applied to every bank and credit union in the U.S. (approximately 8,000 institutions) and is also implemented outside the U.S. by various banking supervisory regulators. The ratings are assigned based on a ratio analysis of the financial statements, combined with on-site examinations made by a designated supervisory regulator. Banking Institutions with deteriorating situations and declining CAMELS ratings are subject to ever increasing supervisory scrutiny. Failed institutions are eventually resolved via a formal resolution process designed to protect retail depositors.

The components of a bank's condition that are assessed:

- Capital adequacy
- Assets
- Management Capability
- Earnings
- Liquidity (also called asset liability management)
- Sensitivity –sensitivity to market risk, especially -interest rate risk)..

RESEARCH DESIGN:

Statement of the Problem: The Problem undertaken to study the financial position and performance and rating of banking financial services in PSB'S and PVB'S on the basis of secondary data using CAMELS Rating Model, Ratios as a tool.

The Scope of the study. Five Top Public Sector banks and Few Private Sector banks are taken as a sample.

Public Sector Banks	Private Sector Banks
State Bank of India (SBI), Canara Bank (CB), Punjab National Bank (PNB),	ICICI bank, Axis bank, HDFC bank,

Shri Lal Bahadur Shastri Rashriya Sanskrit Vidyapeetha

| Bank of Baroda (BOB), Cental Bank of India (CBI) | City Union Bank (CUB), Kotak Mahindra Bank (KMB). |

And Secondary data is collected to study the different service satisfaction level of customers and other operational issues of the commercial banks towards performance and rating.

OBJECTIVES OF THE STUDY:

- To evaluate the overall financial performance and position of the commercial banks with reference to Primary Data.
- To analyze the factors such as CAMELS MODEL and other factors affecting the financial performance and position of the Commercial banks.
- To evaluate the ranking procedure followed by the banks the Commercial through CAMELS Model.

REVIEW OF LITERATURE:

Research has been undergone by research scholars in India and around India so as to derive solutions for various banking problems and prospects in Camel Rating and BASEL Norms in Commercial Banks. An attempt has been made to analyze the crucial aspects of previous research work the summarize report of previous research work is as follows:

THE SUMMARY OF LITERATURE REVIEWS ARE AS FOLLOWS:

Summary of Literature reviews:

Sl. N o	Author/ Citation	Variables Studied	Findings, Suggestions
1.	**Indian Studies:** Mishra Aswini Kumar, G. Sri Harsha, Shivi Anand and Neil Rajesh Dhruva (2012)	CAMELS model	The authors states that most of these banks, including ICICI, Axis, and HDFC lie in a similar rank region. However, these banks' assets etc. vary a great deal and they cannot be judged solely based on the absolute values of the CAMEL ratios.
2.	Dhaval Sureshbhai Desai (August 2013)	CAMELS Model	After evaluating all the ratios, calculations and ratings the authors have given 1st Rank to State bank Of India, 2nd Rank to HDFC, 3rd Rank to Bank of India, and 4th to Bank of Baroda, 5th rank to Axis Bank. Although SBI (1st rank) is leading the banking sector a tough competition is given
3.	Dr.Vighneshwara Swamy, (2014-15)	Basel III Implications	Capital requirements of the commercial banks in recent years and the qualitative impacts on the banking regulation front due to Basel III implementation.

4.	Dr. Suresh Chandra Bihari, (Pacific International Review International,Volume-7,Issue 8 February 2015)	Basel III in Indian Banks and Capital Concerns	The need of capital inflows of Indian banks due to the requirements of commercial banks as per Basel III Norms.
5.	Mr. C.S. Balasubramaniam, Basel III Norms And Indian Banking: Assessment And Emerging Challenges (National Monthly Referred Journal of Research in Commerce & Management, Volume No-1,Issue. No.8, ISSN 2277-1166)	Description of Banking sector since 1991 reforms	The Compliance process by the Indian Banks to Basel Standards in recent period and finaly, the issues and challenges faced by the Indian Banking Sector are posed in the conclusion.
6.	Ms. Uyen Dang, (2011)	CAMELS Assessment framework	The findings revealed that the CAMELS rating is significant to banking supervision and is currently popular among regulators worldwide. Its approach is beneficial as it is an internationally standardized rating, and provides flexibility between on-site and off-site examination; hence, it is the dominant model in assessing banks' performance in AIA. Meanwhile, it has disadvantages of not following the Vietnamese banks closely, ignoring the interaction with bank's top management and overlooking the provisions as well as allowance for loan loss ratios.
7.	Mr.Satyajit Dhar and Mr. Avijit Bakshi (2014)	Various independent variables on NPAs	All the selected Independent variables are key performance determinants of banks in terms of asset quality, earning capacity, management efficiency, capital adequacy and their liquidity. The analysis is based on panel approach, which considers both the spatial and time dimensions of observations.
8.	D.M.Nachane, Aditya Narain, Saibal Ghosh and Satyananda Sahoo (2000)	Product sophistication and customer orientation	The regulatory framework should be designed so as to encourage individual banks to maintain higher CRAR than the stipulated minimum so as to reflect their differential risk profiles.

Sample Technique- Convenience Sample technique.

METHODOLOGY:

Secondary data is used in this study. Some Statistical tools are used to study the evaluation of qualitative and quantitative data from secondary sources. The Secondary data is collected through annual reports, websites and the company brochures, comprehensive references were made from the previous research papers from journals, books and magazines and so on.

LIMITATIONS OF THE STUDY:

- Since the paper work is carried out for a very short period exhaustive findings could not be made.
- Most of the data is taken from the Published sources and it is assumed to be true.

ANALYSIS AND INTERPRETATION:

Analysis using Secondary Data

Table 1: CAMELS Analysis of PSB'S and PVB'S Using Ratios

Table 1: Capital Adequacy Ratio (Proportion)

Sl No.	Name of the Bank	Average (2010-19)	Rank
1	State Bank of India	138.45	1
2	Canara Bank	125.27	4
3	PNB	129.03	2
4	BOB	123.90	6
5	CBI	126.74	3
6	ICICI	124.77	5
7	AXIS	113.45	10
8	HDFC	116.12	8
9	CUB	119.21	7
10	KMB	113.59	9

Source: Source: RBI Annual Reports.

Interpretation:

This ratio measures the capital adequacy ratio of ten banks (both public and private sector banks). Out of ten banks, State Bank of India's capital adequacy ratio are in good position as 138.45, whereas other banks are below the performance of State Bank of India as per given above table. The data are of the other banks are such as PNB (129.03), CBI (126.74), Canara Bank (125.27), ICICI (124.77), BOB (123.90), CUB (119.21), HDFC (116.12), KMB (113.59), Axis (113.45).

Table 2: Assets Quality Ratios (Proportion)

Sl. No.	Name of the Bank	Average (2010-19)	Rank
1	State Bank of India	20.50	7
2	Canara Bank	21.23	6
3	PNB	18.96	8
4	BOB	18.53	9
5	CBI	14.66	10
6	ICICI	65.38	1
7	AXIS	40.53	2
8	HDFC	27.75	5

| 9 | CUB | 38.94 | 3 |
| 10 | KMB | 34.78 | 4 |

Interpretation:

Asset quality rating assesses determines the relative riskiness of assets of the Banks and it can be evaluated by assigning the ranks from 1 to 10 to determine the financial stability of the Banks. A rating of 1 indicates strong asset quality and credit administration practices which indicated in ICICI bank value (65.38) means the bank's asset quality are in better position compared to other banks such as Axis (40.53), CUB (38.94), KMB (34.78), HDFC (27.75), Canara Bank (21.23), SBI (20.50), PNB (18.96), BOB (18.53), CBI (14.66).

Table 3: Management Efficiency Ratios (Proportion)

Sl No.	Name of the Bank	Average (2010-19)	Rank
1	State Bank of India	126788796	4
2	Canara Bank	811227662	1
3	PNB	123664503	5
4	BOB	178468320	2
5	CBI	106753434	7
6	ICICI	105258492	8
7	AXIS	136162795	3
8	HDFC	109432348	6
9	CUB	99424191	9
10	KMB	72555707	10

Interpretation:

Under Management efficiency, the banks can assess its ability to identify, respond and manage the financial risk involved in the day to day institutional operations like credit offers, transactions, interest rates, etc. The Canara bank has sound management efficiency ratio with respect to the other banks. The KMB bank has lowest value where it is to be improved.

Table 4: Earnings Ratios (Proportion)

Sl No.	Name of the Bank	Average (2010-19)	Rank
1	State Bank of India	110.12	1
2	Canara Bank	100.74	2
3	PNB	37.73	4
4	BOB	85.58	3
5	CBI	11.60	8
6	ICICI	10.61	9
7	AXIS	6.57	10
8	HDFC	18.50	7
9	CUB	19.70	5
10	KMB	18.86	6

Interpretation: The ability of the financial institutions to generate returns on the asset employed determines their profits. It is an essential parameter for analysing the risk and recovery of the institution. From the above table shows that the earnings ratios of ten banks as per the ascending order such as SBI

(110.12), canara bank (100.74), BOB (85.58), PNB (37.73), CUB (19.70), KMB (18.86), HDFC (18.50), CBI (11.60), ICICI (10.61), Axis (6.57) respectively.

Table 5: Liquidity Ratios (Proportion)

Sl No.	Name of the Bank	Average (2010-19)	Rank
1	State Bank of India	11.76	10
2	Canara Bank	23.39	3
3	PNB	24.15	2
4	BOB	20.89	4
5	CBI	24.44	1
6	ICICI	16.05	9
7	AXIS	16.42	7
8	HDFC	16.13	8
9	CUB	18.37	5
10	KMB	16.54	6

Interpretation:

The financial bank institutions need to keep sound liquidity position to ensure carrying of uninterrupted business operations. In that view the above table clearly states that CBI (24.44) bank has better liquidity positions compared to other banks. The other banks has following ranks are given based on their values. The values are as follows: PNB (24.15), canara bank (23.39), BOB (20.89), CUB (18.37), KMB (16.54), Axis (16.42), HDFC (16.13), ICICI (16.05), SBI (11.76).

Table 6: Sensitivity Ratios (Proportion)

Sl No.	Name of the Bank	Average (2010-19)	Rank
1	State Bank of India	6.03	7
2	Canara Bank	5.98	8
3	PNB	6.43	6
4	BOB	5.70	9
5	CBI	7.51	3
6	ICICI	6.73	4
7	AXIS	6.68	5
8	HDFC	7.73	2
9	CUB	6.73	4
10	KMB	8.41	1

Interpretation:

The effect of market fluctuations on the financial bank institutions, such as the response to changes in interest rates, commodity price, foreign exchange rates, derivatives, etc. i.e. lower the values is better the position of the banks in financial terms. From above table, it is clear that the BOB (5.70) has less sensitivity ratio related to financial risks and the highest sensitivity ratio are faced by BOB (5.70) and followed by other banks such as Canara bank (5.98), SBI (6.03), PNB (6.43), Axis (6.68), ICICI (6.73), CBI (7.51), and HDFC (7.73) respectively.

CONCLUSION:

The Paper can be concluded that the study explains the Commercial Banks Performance and Position in major Parameters are overall satisfactory and still there is a scope for further Improvement which is beneficial in coming years.

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