A STUDY ON FINANCIAL LITERACY: UNDERSTANDING INVESTORS SENTIMENT AND BEHAVIOURAL BIASES OF INVESTORS

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Abstract: Financial literacy in India remains significantly lower compared to the general literacy rate, with only 27% of the population considered financially literate. This study endeavours to examine the unique challenges faced by individuals in India regarding financial literacy and compares societal perceptions and behaviours with those in other countries. In India, individuals often rely on informal sources for financial assistance, such as borrowing from peers and friends, due to factors like limited banking infrastructure, complex documentation procedures for loans, and insufficient awareness of government schemes for small-scale businesses.

The study examines how knowledge, attitude, investor sentiment, and behavioural biases influence individuals' investment decision-making processes. A bibliometric analysis has been conducted on another to summarize key findings, methodologies, journal sources, countries of origin, and publication years of the reviewed articles. Of the fifty articles reviewed, seventeen originate from India, while the rest represent various countries. Commonly employed methodologies include ANOVA, Partial Least Square Structural Equation Method (PLS-SEM), Exploratory Factor Analysis, Confirmatory Factor Analysis, and Multivariate Regression Analysis. However, it's important to note the limitations of this study, such as the restricted scope of only reviewing fifty articles due to time constraints. This systematic review sheds light on the complexities of financial literacy and its implications for investment decision-making, particularly in the Indian context. By synthesizing existing research findings, this study contributes to a deeper understanding of financial behaviours and paves the way for future research and policy interventions aimed at enhancing financial literacy and decision-making capabilities among individuals.

Keywords- Financial literacy, investor sentiment, behavioural biases

INTRODUCTION

There has been plethora of studies in the field of financial management around the world and also in India. Financial management studies have shown how to reduce risk and maximize wealth. It has different theories like Expected Utility Theory, Markowitch Model, Capital Pricing Asset model, Efficient Market Theory etc. One of the assumptions of these theories is that people are rational and while making investment decisions they make prudent choices. However, in reality people do not always reflect this kind of rationality while choosing investments for savings or while investing in stock markets. Stock markets have seen bubbles, have seen crashes at different points of time and as the news spread, it crashed across the economies. These questions have not been explained by the Efficient Market Theories and other financial theories. Some of the factors that influence a person's decision making are knowledge on financial literacy, personality traits, attitudes, behavioural biases, socio-economic and demographic factors. However, studies regarding financial literacy in have gained momentum in the past few years in India. According to a report by Reserve Bank of India financial literacy in India is quite low compared to the normal literacy rate in India which is around 77.7%, financial literacy statistics shows that only 27% of the people are financially literate- which means they are equipped to take decisions on financial matters which leads to the human well-being. While India is ahead in terms of financial literacy when compared to neighbouring countries like Bangladesh, Nepal, Afghanistan, it lags behind Bhutan, Myanmar, Sri Lanka, China and Pakistan. Level of financial literacy varies across different states in India. Reserve bank of India has also taken initiatives and issued guidelines regarding financial education and financial literacy for the people of India. It has been observed by the government in the study that there has been a wide gap between the financial literacy of males and females. Females lag behind the males in terms of financial knowledge, thus affecting their financial decision-making abilities. It has also been found that some regions like western part of India have more awareness of financial literacy than eastern part of India. Financial literacy is important as it ultimately leads to the financial well-being of the people. (Reserve bank Of India)

The study of financial literacy has a difference between India and other countries in terms of differences in societal perceptions of the people. People in India have the perceptions that they can borrow from peers and friends during time of need, but, people in western countries rely more on formal financial institutions for such borrowing. One of the main reasons can be lack of banking branches in remote areas, non-availability of loans from the banking sectors due to documentation procedure, lack of awareness of government schemes of small-scale business people and how to avail such loans.

This study aims for a systematic literature review on financial literacy, behavioural biases, how social, demographic factors, personality, attitude etc. affect the decision making of the investor. The paper has been segmented and summarized how financial literacy is associated with five different influencing factors like: -

1. Knowledge, personality traits like risk-taking propensity, negative emotion, extraversion, masculinity, preference for innovation and conscientiousness. Attitudes are part of individuals' personality thus the study combines all the articles which discusses different personality traits and attitudes.
2. Portfolio diversification, stock market volatility
3. Behavioural biases like herding mentality, overconfidence, heuristic biases, framing effect cognitive illusions, disposition effect and sentiment analysis
4. Demographic factors, family structure and influences, socio economic structure, schooling (formal education)

5.   Systematic literature review or bibliometric analysis

LITERATURE REVIEW

1.   **Literature based on financial literacy knowledge, attitude and personality traits:** (Robert Durand, 2012) in the study finds out that personality traits like risk-taking propensity, negative emotion, extraversion, masculinity, preference for innovation and conscientiousness are associated with behavioural biases like overconfidence and overreaction in financial markets. (Aslihan Gizem Korkmaz, 2021) states financial literacy affects the inconsistency between risk preference and risk behaviour of households in China. Financial literacy decreases the inconsistency between risk preference and risk behaviour for risk-seeking households, but it increases this inconsistency for risk-averse households. Financial literacy has a positive effect on risky behaviour, encouraging risky behaviour for both risk-seeking and risk-averse households. (Zhiyuan Luo, 2023) in their study states that knowledge has a positive influence on self-confidence and behaviour of the investor. Absence of attitude suggests the mediating effect of the self-control variable between attitude and behaviour. Heterogeneity in knowledge and self-confidence levels affects the applicability of the model in a comparative study on financial literacy of young adult Indians with other countries (Sobhesh Kumar Agarwalla, 2015) highlights the working young in urban India exhibit inferior financial knowledge, inferior financial attitude, and superior financial behaviour compared to their counterparts in other countries. Financial decision making improves with improvement in knowledge of financial literacy. The level of financial literacy among the working young in urban India is comparable with similar groups in other countries. The most important measure of assessing financial literacy, with basic knowledge of finance affecting risk management, money management, and saving and investment has been highlighted in (Sharma, 2022). Basic knowledge of finance is highlighted as the most important enabler of financial literacy, significantly influencing other literacy measures such as saving and investment, money management, and risk management. The study concludes that improving basic knowledge of finance can significantly enhance knowledge of other financial literacy measures. In her study, (Fatima Akhtar, 2017) concluded that social influence positively moderates the relationship between extraversion and perceived investment performance, while it negatively moderates the relationship between agreeableness and perceived investment performance. Personality traits have a significant relationship with perceived investment performance, which is moderated by social influence. Social influence is a significant predicator for the unique relationship between personality trait and perceived investment performance. How financial information affects risk perception has been studied by (Nadia Linciano, 2018), where she has highlighted that he perceived riskiness of financial products is affected by the way information is disclosed, with perceived complexity being the main driver of perceived risk. Risk perception is affected by the complexity of the information disclosure, and this relationship is influenced by individual characteristics such as financial knowledge, personal traits, and behavioural biases. The article by (Tullio Jappelli a, 2013) presents an inter-temporal consumption model of investment in financial literacy, highlighting the benefits of such investment in increasing the returns on wealth. The model suggests that the decision to invest in financial literacy and saving decisions are driven by the same factors. The paper highlights that the relationship between financial literacy and saving is not causal, as both variables rely on households' resources, preference parameters, and the costs of literacy. (Yeh, 2020) highlights that financial literacy positively affects awareness of post-retirement needs, comparison of financial products, reduces biases, and contributes to saving for retirement. The scholarly article by (Tetsuya Kawamura, 2021) concluded that high levels of financial literacy are associated with inappropriate financial behaviours and attitudes, such as speculative investment, over-borrowing, and financial naivety. The determinants of financial behaviour are associated with age and gender. Financial choices are determined by participants' "perceived" and actual financial literacy. (Adami, 2017) Socio-economic factors significantly influence individuals' retirement planning and saving behaviours, with differences in education, income, and employment status playing a crucial role. The workplace disadvantage experienced by Pakistani and Bangladeshi women significantly impacts their long-term saving abilities, although women from Asian ethnic groups with good education and social standing display greater saving rates than the control group. The financial disadvantage stemming from employment status particularly affects individuals of Pakistani and Bangladeshi origins and is likely to persist and worsen without intervention. (Sophie von Stumm, 2012) Socioeconomic status is associated with financial capabilities but not with money attitudes. Money attitudes and financial capabilities are largely independent. - Both financial capabilities and money attitudes independently contribute to the risk of encountering unfavourable financial outcomes. Financial capabilities are greater risk factors of adverse financial outcomes than money attitudes, but the latter are likely to be promising targets for intervention. A study by (Olivia S Mitchell) states that low levels of debt literacy are the norm, and understanding of the basic mechanics of debt is especially limited among the elderly, women, certain minorities, and people with lower incomes and wealth. (Elke U Weber, 2002) Risk attitudes inferred from behaviour either directly or via utility. Study 1: - Individual, gender, and content domain differences in apparent risk taking seem to be associated primarily with differences in the perception of the activities' benefits and risk, rather than with differences in attitude towards perceived risk. Study 2: - study provides a new risk-attitude scale that allows researchers and practitioners to assess both conventional risk attitudes and perceived-risk attitudes in six commonly encountered content domains. Study 3: - provides additional evidence for the hypothesis that perceived-risk attitude, which factors domain differences in risk perception out of risk behaviour, is significantly more consistent across domains for a particular respondent than conventional risk attitude. Most respondents were significantly or mildly perceived-risk averse in all content domains. What differed between individuals Study 3:-(partly as a function of gender) and between domains were perceptions of the benefits and risks of risky activities. In the study on risk attitude, (Carmen Keller, 2006) states that situational characteristics as well as person-centred characteristics (like age, gender etc.) jointly influence risk-taking decision of the investors.

2. **Literature based on financial literacy and portfolio diversification, stock market volatility:** (Solomon Antwiagyei Kuffour) states that stock market participation is low as majority of respondents have a low financial literacy. Males are more financial literate than females. Financial literacy also varied according to education level. (Rajendra N. Paramanik, 2020) In his study referred that negative market sentiment has a dominant impact on shaping the conditional volatility in the Indian stock market, and there is evidence of noise trading in the financially immature Indian stock market. In the study, (Margarida Abreu, 2010) states that there is a positive impact of educational levels and financial knowledge on diversification, the concentration of portfolios in domestic assets and the equity market, and the strong increase in the number of assets with financial knowledge, education, and sources of information. (Tufano, 2015) highlighted that there is widespread low debt literacy among Americans, particularly among specific demographic groups. Higher financial knowledge linked to better debt management. Overestimating debt doubling time linked to difficulty paying off debt. (Sarah D. Asebedo, 2018) sighted how psychological characteristics significantly shape financial self-efficacy in older pre-retirees, with specific traits and factors identified as predictors of financial self-efficacy (FSE. Psychological support and counselling programs focused on retirement planning and FSE development may be beneficial.

3. **Behavioural biases like herding mentality, overconfidence, heuristic biases, framing effect, cognitive illusions, disposition effect and sentiment analysis:** Heuristic and herding biases studied by (Nekatrios Gavrilakis, 2020) states that heuristic variable positively affects private investor's portfolio construction and performance satisfaction level. Herding does not affect portfolio construction and performance satisfaction level. Heuristic and herding contribute significantly to finance professionals' portfolio construction and performance satisfaction level. (Suresh, 2021) suggested that behavioural biases like heuristic biases, framing effect, cognitive illusions and herd mentality have a direct impact on investment decisions, leading to less investment gains in the stock market. Financial literacy helps individual investors to avert irrational decisions to some extent. Both financial literacy and behavioural biases influence investment decisions of individual investors. (Jinesh Jain, 2023) in his study pointed out that financial literacy positively influences decision-making and is serially mediated by herding and overconfidence bias. Investors can improve decision-making by enhancing financial literacy. (Shikha Bhatia, 2023) highlighted that financial knowledge has a positive impact on the financial behaviour and well-being of an individual. Financial behaviour fully mediates the relationship between financial attitude and well-being when a positive financial attitude along with financial knowledge is combined. The study by (H. Kent Baker, 2018) shows how financial literacy has an adverse association with the disposition effect and herding bias, a favourable relation with mental accounting bias, but no considerable relation with overconfidence and emotional biases. Age, occupation and investment experience have association with overconfidence and emotional biases. Males are more overconfident than are females about their knowledge of the stock market. In the study, (Mohd Adil, 2022) pointed out that behavioural biases have an impact on investment decisions among male and female investors, as well as the moderating effect of financial literacy on these associations. Segmentation of investors based on the experience of investing has been done by (Shalini Kalra Sahi, 2021) The study identified four main segments of individual investor biases in India: i) the Novice Learner, ii) the Competent Confirmer, iii) the Cautious Anticipator, and iv) the Efficient Planner. There is a segment of investors who have biases and also have high financial satisfaction levels. In his study, (Kasilingam, 2016) concluded that all selected behavioural bias factors have shown significant influence on investors' investment decisions. Relationship between heuristics and personality was stronger than other relationship factors. There is no causal relationship between frames and personality, indicating a complete mediation effect among emotions, personality, and frames. In the study (Dimitris Christelis, 2010) sighted that cognitive impairment has a strong negative influence on stock market participation. Higher cognitive abilities are positively correlated with stockholding. The effect of cognitive abilities on participation is larger among the more socially connected individuals. In their article (Thaler, 2007) Employees have low financial decision making and lack training upon which to draw in making the relevant decisions. They join late in advantageous plans and seldom switch over from less gainful plans. They take naive financial strategies. Investors are relatively passive. They are slow to join profit-making plans; they make limited changes; and they follow naive diversification strategies. The winner loser effect has been emphasized by (F. M. De Bondt, 1987) and the study states that excess returns for losers in the test period are negatively related to both long-term and short-term formation period performance. The winner-loser effect cannot be attributed to changes in risk as measured by CAPM-betas. The earnings of winning and losing firms show reversal patterns that are consistent with overreaction. According to (Mousumi Singha Mahapatra, 2019) personal financial planning of Indian households has two influencing factors, viz, one behavioural component-mental accounting and the other cognitive component i.e. financial cognition. In the article (Mydhili Virigineni, 2017) came to the conclusion that investment decision is more on human behaviour rather than rational decisions making as while taking investment decisions, behavioural biases were also influencing factors.

4. **Literature based on financial literacy and demographic factors, socio economic structure, family structure, spousal influences, schooling:** In the study (Ani Caroline Grigion Potrich, 2018) states that shows that financial literacy has noteworthy impacts on individuals and their families, resulting in better money management and investment outcomes, thus overall financial well-being. The study conducted in Brazil highlights the complex and noteworthy impacts of financial literacy on various behavioural factors, with a major direct relationship found between financial literacy and improved compulsive buying behaviours. The indirect impact of financial literacy on propensity to debt accumulation is greater when there is only the compulsive buying behaviour in this relationship. In the study of financial literacy of adults in Germany, respondents show considerable lack of knowledge in the areas of debt, creation of wealth, money transfer and monetary policies. (Michael Schuhen, 2022) referred that these deficits are not dependent on age. Older respondents are not savvy in digital financial services. (Adam, 2018) in the study of "Does gender disparity still persist after retirement; Evidence in Ghana" shows that there is a gender disparity in financial literacy among retirees in the Cape Coast Metropolis, with males showing domination in financial literacy and having a significantly higher financial literacy index compared to females. The study suggests that older men are stronger in computational ability, indicating a need for policy responses to address the gender disparities in financial literacy, particularly focusing on improving the computational ability of females. (Swati Prasad, 2021) highlighted that behavioural factors, socio-economic factors, and financial literacy significantly affect investment decisions for both genders. The study found that socio-economic factors have a significant impact on investment decisions, and financial literacy is an important predictor for both men and women It also indicates that the influence of behavioural factors on investment decisions differs between men and women. (Aneesh S. Tambolkar, 2021) had studied the

financial literacy among doctors in Maharashtra. The study concludes that there is gender disparity in financial knowledge among doctors with males having higher financial literacy than females. There is significant association between financial knowledge and practices, and the unsatisfactory level of financial knowledge among Indian doctors, especially younger ones. (Sang-Hee Sohn, 2012) has pointed out that media as the primary financial socialization agent and possession of a bank account were associated with higher levels of financial literacy. Attitudes towards money significantly influenced financial literacy, with those perceiving money as good or as a reward for efforts reporting higher levels of financial literacy, while those perceiving money in terms of achievement or avoidance had lesser amounts of financial literacy. Money attitudes were found to be the principal predictor of financial literacy of the Korean high school students, followed by financial exposures, background qualities, and socialization agents. Age, marital status, and society criterion do not influence the choice of investment alternatives. (Selim Aren A. N., 2016) concludes that preferences of investment are influenced by financial literacy and risk perception, with men showing higher advanced financial literacy and greater risk-taking propensity compared to women. Single women also exhibit a higher tendency to take risks compared to married women. (Selim Aren S. D., 2015) Age, marital status, and society criterion do not influence the choice of investment alternatives. Different factors have varying levels of impact on different investment alternatives. Risk criterion for investment decision and financial literacy level are relatively important factors in investment instrument choice. (Hussein A. Hassan Al-Tamimi, 2009) highlights that financial literacy of UAE investors is significantly below the required level. There is a significant difference in financial literacy between men and women, with women having a lower level of financial literacy. Financial literacy is influenced by income level, education level, and workplace activity. According to (Chris Brooks, 2019) investigation of financial risk tolerance, differences between men and women, policy implications related to wealth accumulation and financial education, the potential impact of robo-advice on closing the gender gap in investment risk taking, and the need for women to assert their risk preferences during joint financial decision-making. The paper also suggests the importance of socialization in determining women's lower levels of investment experience and proposes a potential future research agenda involving qualitative investigation. (Scheresberg, 2013) highlights the widespread lack of financial knowledge among young adults and the importance of financial literacy in improving financial outcomes. (Hsu, 2015) suggests that the returns to financial knowledge depend on the entire survival function of both husbands and wives and are therefore not linear in age. (Mitchell, 2008) Women display lower levels of financial literacy and are less likely to plan for retirement and be successful planners. Only 17% of the women engaged in successful retirement planning. The decision of how much to save for retirement is complex, and many respondents struggle with retirement calculations, particularly women. (Jere R. Behrman, 2012) Financial literacy and schooling are strongly associated with wealth outcomes, with financial literacy showing even more potent effects in instrumental variables (IV) estimates. Using OLS to estimate the effects of financial literacy and schooling may be misleading due to measurement error and unobserved factors. Investments in financial literacy could have high payoffs.

5. **Systematic literature review or bibliographic analysis:** (Shantha Gowri B, 2019) categorized news from broad to specific, the selective attention of investors based on information content and influence, the significance of news on investor's decision making, and the influence of different types of news on individual investor's decision making in stock markets. The paper also emphasizes the importance of understanding the influence of news on investor's decision making and its linking effect on behavioural theories and biases. (Sourav Prasad, 2023) in their articles use the Baker and Wurgler index and text-based sentiment analysis. An Internet-search-based Investor Sentiment Index (ISI) has been used for a few studies. The study highlights lack of direct measures or a robust qualitative approach in constructing the ISI. (Aditi N Kamath, 2022) has highlighted that in the field of behavioural finance investor sentiment has gained significance. Sentiment Analysis and Sentiment Index are the well-advanced themes in this area. Consumer confidence, closed-end fund discount, panel data, monetary policy, and real estate are specialized themes for the academicians and researchers as there are limited studies on the themes. Stock price, Granger causality, and financial crisis are minor themes with abundant studies. Some of the upcoming themes such as IPO under-pricing, overreaction, volatility, Covid-19, Bitcoin, and social media.

RESEARCH OBJECTIVE

The basis of research has been the review of literature on scholarly articles. Extensive literature review could not be carried out due to the time constraints. Fifty articles have been chosen for the systematic literature review based on convenient sampling method. For bibliometric analysis, another seventy-four articles have been selected. The following objectives have been summarized below:
1. The systematic literature review of one hundred and twenty-four articles.
2. To study the impact of financial literacy on decision making of an individual's investment behaviour through these literature review
3. How behavioural biases affect investment decisions in-spite of an individual's financial literacy
4. Research methodology followed in the articles whose literature review has been performed.
5. Bibliometric analysis of the seventy four articles with respect to co-author, co-citation and with respect to country was analysed using VOSviewer.

DATA SOURCE AND METHODOLOGY OF THE STUDY

Selection of search term for systematic literature review: Three scholarly database websites having free access from Google scholar, Science Direct, Routledge, and artificial intelligence website like Research Rabbit has been given. The key words that were used for search was financial literacy, knowledge, attitude, and behavioural biases, investment decision and related articles on financial literacy, behavioural biases, sentiment analysis, have been downloaded for systematic literature review. The aim of the study is to find out the relationship between financial literacy and the factors affecting an investor's decision making.

Search method for bibliometric analysis: Search has been given in artificial intelligence website Dimensions AI, where the keywords were financial literacy, behavioural biases, and investors on February 13, 2024. Out of these seventy four scholarly articles, fifteen articles are from UGC journal list group II and one article is from UGC journal list group I. Of the seventy four articles that were used for bibliometric analysis, only three articles are same articles as with literature review.

Study method for Systematic literature review: Fifty scholarly articles have been studied. Literature for the study has been adopted from prominent journals from the publishers of Emerald Insight, Elsevier, Routledge, Springer. Attempt has been made to

study the articles of different countries. The main findings have already been written in the literature review and the methodologies have been shown for each article in the table form.

Selection method for systematic literature review: When the initial search for the systematic review, I found sixty-eight relevant documents. Three irrelevant documents were deleted. Fifteen duplicate documents have been eliminated using Microsoft Excel. The study on financial literacy has been divided into five segments, the first one being on financial literacy knowledge, attitude and personality traits. Table 1 shows literature review of articles from India and other countries.

Table 1: - Literature review of articles segment-wise and Indian articles studied in each segment.

Segmentation of articles	Total articles studied under each segmentation	Total number of articles from India
Literature based on financial literacy knowledge, attitude and personality traits	15	3
Literature based on financial literacy and portfolio diversification, stock market volatility	5	1
Behavioural biases like herding mentality, overconfidence, heuristic biases, framing effect cognitive illusions, disposition effect and sentiment analysis	12	8
Literature based on financial literacy and demographic factors, socio economic structure, family structure, spousal influences, schooling	15	3
Systematic literature review or bibliographic analysis	3	3

Table 2: - Literature review of articles based on methodology of literature review: -

Sl. no.	Authors	Title	Data Type	Methodology	Journal	Country
1	Robert Durand, Rick Newby, Kevin Tant, Sirimon Trepongkaruna (2012)	Overconfidence, overreaction and personality	Primary	The methodology used in the study involves measuring subjects' personality using established instruments such as the NEO-PIR, NEO-FFI, Bem's psychological gender questions, and Jackson's instruments for preference for innovation and risk-taking propensity.	Review of Behavioral Finance, Vol. 5 Issue: 2, pp.104-133	Australia
2	Thiago Borges Ramalho and Denis Forte (2018)	Financial literacy in Brazil Do knowledge and self-confidence relate with behavior?	Primary	The methodology used in the study is descriptive statistics, partial least square method and Structural Equational model (PLS-SEM) using path analysis. Difference between the groups were found out using Partial least square multi-group analysis (PLS-MGA)	Qualitative Research in Financial Markets, Vol. 10 Issue: 2, pp.210-251, Emerald	Brazil
3	Ani Caroline Grigion Potrich, Kelmara Mendes Vieira (2018)	Demystifying financial literacy: a behavioural perspective analysis	2487 samples, primary data	Confirmatory Factor Analysis (CFA) and Structural equation method (SEM) has been used. The convergent validity of each construct was analysed using the absolute fit indices: chi-square statistics, root mean square residual (RMSR), root mean square error of approximation (RMSEA), goodness-of-fit index (GFI) and the comparatives fit indices: the comparative fit index (CFI), normed fit index (NFI) and Tucker–Lewis Index (TLI).	Management Research Review Emerald	Brazil
4	Aslihan Gizem Korkmaz, Zhichao Yin, Pengpeng Yue, Haigang Zhou (2021)	Does financial literacy alleviate risk attitude and risk behavior inconsistency?	31,432 household samples, Secondary	Pearson's correlation, mean comparison test, two stage least square method (SLS), factor analysis, Probit model has been used.	International Review of Economics and Finance 74 (2021) 293–310 Elsevier	China
5	Zhiyuan Luo, S M Ferdous, S. M. Ferdous Azam, Laixi Wang (2023)	Impact of financial literacy on household stock profit level in China	Secondary	The methodology employs an ordinary least squares (OLS) model and an instrumental variable regression analysis using the two-stage least squares method (IV-2SLS) for the primary regression	PLoS ONE 18(12): e0296100	China

			analysis and endogeneity testing, respectively and also used Probit and mediation effect models for robustness and mediation effect tests.		
6	Michael Schuhen, Susanne Kollmann, Minou Seitz, Gunnar Mau, Manuel Froitzheim (2022)	Financial literacy of Adults in Germany FILSA Study Results	Primary	The methodology used is Rasch modelling and SEM with CFA to analyse the data.	Journal of risk and financial management (MDPI)	Germany
7	Adam, Boadu, Frimpong (2018)	Does gender disparity in financial literacy still persist after retirement? Evidence from Ghana	334 samples, Primary	Bivariate analysis with Pearson's Chi-Square method. Predictive Analytics Software (PASW) for Windows application programme (version 17.0) was used to carry out carry out the analysis with 5% significance level.	International Journal of Social Economics	Ghana
8	Solomon Antwiagyei Kuffour, George Adu (2019)	Financial Literacy, Trust and Stock Market Participation in Ghana	398 samples, Primary	Correlation, Probit regression methods, sampling adequacy tests by Kaiser-Meyer Ohlin test, Principal Component analysis to create the index.	Economics Literature	Ghana
9	Nekatrios Gavrilakis, Christos Floros (2021)	The impact of heuristic and herding biases on portfolio construction and performance: the case of Greece	Primary	Multiple regression analysis.	Review of Behavioral Finance, Emerald	Greece
10	Suresh G (2021)	Impact of Financial Literacy and behavioural biases on investment decision making	250 samples, Primary	(CFA) and Goodness of fit test in Structural Equation Modelling (SEM)	FIIB Business Review, Sage	India
11	Jinesh Jain, Nidhi Walia, Manpreet Kaur, Kirti Sood, Dilraj Kaur (2023)	Shaping Investment Decisions Through Financial Literacy: Do Herding and Overconfidence Bias Mediate the Relationship?	436 individuals, Primary	Partial Least Squares Structural Equation Modelling (PLS-SEM) to examine the complex model of serial mediation.	Global Buisness review, Sage	India
12	Shikha Bhatia, Sonali Singh (2023)	Exploring financial well-being of working professionals in the Indian context	466 samples, Primary	Smart Partial Least Square Method. SEM has been utilized in measurement of items and was checked using Cronbach's alpha. The data were further assessed for the existence of any common method bias (CMB). To examine CMB, Harman single factor test was carried out utilizing principal component analysis. Both discriminant and convergent validity were assessed for measuring validity of the analysis	Journal of Financial Services Marketing, Springer	India

13	H. Kent Baker, Satish Kumar, Nisha Goyal, Vidhu Gaur (2018)	How financial literacy and demographic variables relate to behavioral biases	501 samples, Primary	One-way analysis of variance (ANOVA), factor analysis, and multiple regression analysis	Managerial Finance. Emerald (2018)	India
14	Shantha Gowri B, Vedantam Seetha Ram (2019)	Influence of news on rational decision making by financial market investors	Secondary	Conceptual model and descriptive statistics	Investment Management and Financial Innovations, Volume 16, Issue 3, 2019	India
15	Sourav Prasad 1, Sabyasachi Mohapatra 1, *, Molla Ramizur Rahman 2 and Amit Puniyanin (2023)	Investor Sentiment Index: A Systematic Review	Secondary	122 articles were accepted as samples. SLR and BA were used to conduct an in-depth review of the past literature on ISIs. .	Int. J. Financial Stud. https://www.mdpi.com/journal/ijfs, MDPI	India
16	Aditi N Kamath, Sandeep S. Shenoy, Subrahmanya Kumar N. (2022)	An overview of investor sentiment: Identifying themes, trends, and future direction through bibliometric analysis	1919 articles as sample, Secondary	Bibliometric Analysis	Investment Management and Financial Innovations. LLC "Consulting Publishing Company "Business Perspectives	India
17	Mousumi Singha Mahapatra, Jayasree Raveendran, Anupam De (2019)	Building a Model on Influence of Behavioural and Cognitive Factors on Personal Financial Planning: A Study Among Indian Households:	359 samples, Primary data	Explorative factor analysis, reliability tests, and Confirmatory Factor Analysis in Structural Equational Model to test the proposed hypotheses.	Global Business Review, IMI. Sage	India
18	Pramanik, Singhal (2020)	Sentiment analysis of Indian stock market volatility	Secondary	The methodology involves gathering and processing texts from relevant sources, using Natural Language Processing (NLP) techniques and NRC word-emotion association lexicon to construct market sentiments, employing PCA for sentiment score construction, and using three different GARCH models, Garch, E Garch and GJR Garch model to analyze the impact of market sentiments on the Indian stock market's volatility.	ScienceDirect, Procedia Computer Science Elsevier	India
19	Satish Kumar, Sandeep Rao, Kirti Goyal, Nisha Goyal (2022)	Journal of Behavioral and Experimental Finance: A bibliometric overview	441 articles, Secondary	Bibliometric Analysis	Journal of Behavioral and Experimental Finance, Elsevier	India
20	Sobhesh Kumar Agarwalla, Samir K. Barua, Joshy Jacob and	Financial Literacy among Working Young in Urban India	754 samples, Primary	Multinomial logistic regression, and spearman's tank correlation.	World Development, Vol. 67, pp. 101–109, 2015 Elsevier	India

	Jayanth R. Varma (2014)					
21	Swati Sharma	Enablers to Financial Literacy: A DEMATEL approach	Primary data	The methodology used in the study is the DEMATEL (Decision making trial and evaluation laboratory) method, which was employed to investigate and draw causal relations among measures of financial literacy, as well as to rank the measures based on their importance. The study also involved surveying experts in the finance domain and using their responses as input to the DEMATEL method.	ScienceDirect, Procedia Computer Science Elsevier	India
22	Swati Prasad, Ravi Kiran, Rakesh Kumar Sharma (2021)	Behavioural, Socio-economic Factors, Financial Literacy and Investment Decisions: Are Men More Rational and Women More Emotional?	514 samples, Primary	PLS-SEM has been used for model development and analysis.	The Indian Economic Journal, Sage	India
23	Aneesh S. Tambolkar, Isha A. Tambolkar, Manas V. Pustake, Purushottam A. Giri, Punita Raval	Financial knowledge, attitude and investment practices among Indian doctors	286 samples, Primary	Data is highly skewed; thus, non-parametric tests were used. Kruskal-Wallis' test was used to compare mean ranks. Among the non-parametric tests, proportions of test variables above and below medians values were compared using the Chi-square test. Binary correlations were performed through Pearson's rank correlation.	International Journal of Community Medicine and Public Health | September 2021 | Vol 8 | Issue 9	India
24	Mohd Adil, Yogita Singh and Mohd. Shamim Ansari (2022)	How financial literacy moderate the association between behaviour biases and investment decision?	253 samples, Primary. includes a cross-sectional research design, data collection through a structured questionnaire, validity and reliability analysis using Pearson correlation and Cronbach's alpha test	Hierarchical regression analysis for hypothesis testing, and the use of moderation in analysing the association between variables.	Asian Journal of Accounting, Vol. 7 No. 1, 2022 pp. 17-30 Emerald	India
25	Fatima Akhtar, K.S. Thyagaraj and Niladri Das (2017)	The impact of social influence on the relationship between personality traits and perceived investment performance of	396 samples for Primary data, Secondary data has also been used	Hierarchical regression analysis and structural equation modelling using AMOS software. To check the robustness of the model an alternative model has been used.	International Journal of Managerial Finance, Emerald	India

		individual investors Evidence from Indian stock market				
26	Shalini Kalra Sahi, Ashok Pratap Arora (2011)	Individual investor biases: a segmentation analysis	377 samples, Primary	There is homogeneous group of investors, thus cluster analysis and one way ANOVA was performed.	Qualitative Research in Financial Markets, Vol. 4 Iss 1 pp. 6 - 25, Emerald	India
27	A. Charles and R. Kasilingam (2016)	Impact of selected behavioural bias factors on investment decisions in equity investors	742 samples, Primary	Multistage random sampling technique and the development of a conceptual model using Structural Equation modelling (SEM). Z test for testing goodness of fit, Root Mean Square Error Approximation (RMSEA) has been adopted.	ICTACT JOURNAL ON MANAGEMENT STUDIES, MAY 2016, VOLUME: 02, ISSUE: 02	India
28	Nadia Linciano, Caterina Lucarelli, Monica Gentile & Paola Soccorso (2018)	How financial information disclosure affects risk perception. Evidence from Italian investors behaviour	254 Italian investors, Primary	There is endogeneity bias, thus multivariate probit model has been used.	THE EUROPEAN JOURNAL OF FINANCE, Routledge, Taylor and Francis	Italy
29	Tullio Jappellia, Mario Padula (2013)	Investment in financial literacy and saving decisions	Secondary	A multi period model has been developed. Regression and OLS method (for regression) has been used.	Journal of Banking & Finance 37 (2013) 2779–2792, Elsevier	Italy
30	Dimitris Christelis, Tullio Jappelli, MarioPadula (2010)	Cognitive abilities and portfolio choice	Secondary	The methodology involves providing a framework to understand how cognition affects stock market participation, describing the microeconomic data and cognitive ability indicators, presenting empirical results, and summarizing the findings.	Elsevier	Italy
31	Tsung-ming Yeh (2020)	An empirical study on how financial literacy contributes to preparation for retirement	Secondary	. Factor analysis is used to compute a composite index as a measure of financial literacy.	Cambridge University Press, Journal of Pension Economics and Finance	Japan
32	Tetsuya Kawamura, Tomoharu Mori, Taizo Motonishi, Kazuhito Ogawa (2021)	Is Financial Literacy Dangerous? Financial Literacy, Behavioral Factors, and Financial Choices of Households	Secondary and primary	Descriptive statistics, benchmark regression	Journal of The Japanese and International Economies, Elsevier	Japan
33	Margarida Abreu, Victor Mendesz (2010)	Financial literacy and portfolio diversification	Primary	OLS regression techniques	Routledge, Taylor and Francis	Portugal
34	Sang-Hee Sohn,So-Hyun Joo, John E. Grable, Seonglim Lee, Minjeung Kim 2012)	Adolescents' financial literacy: The role of financial socialization agents, financial experiences, and	Secondary and Primary	Step wise regression analyses, and a probit analysis was performed to correct for possible selection bias.	Journal of Adolescence, Elsevier	Souh Korea

		money attitudes in shaping financial literacy among South Korean youth				
35	Selim Aren, Asiye Nur Zengin (2016)	Influence of Financial Literacy and Risk Perception on Choice of Investment	Primary	Factor analysis for personality traits and risk perception scales, and the use of statistical analyses such as one-way ANOVA and Duncan tests.	Elsevier, science direct	Turkey
36	Selim Aren, Sibel Dinc Aydemir (2015)	The Factors Influencing Given Investment Choices of Individuals	112 samples, Primary	Stepwise regression analysis is employed for each investment alternative to identify the factors directing investment products.	Elsevier	Turkey
37	Hussein A. Hassan Al-Tamimi, Al Anood Bin Kalli (2009)	Financial literacy and investment decisions of UAE investors	Primary	ANOVA test, logistic regression and regression analysis	The Journal of Risk Finance	UAE
38	Adami, R., Carosi, A. and Sharma, A. (2017)	Retirement Saving in the UK: a Life-Cycle Analysis	Secondary	Regression analysis	Westminster Research, Emerald	United Kingdom
39	Sophie von Stumm, Mark Fenton O'Creevy, Adrian Furnham (2012)	Financial capability, money attitudes and socioeconomic status: Risks for experiencing adverse financial events	Primary	Principal factor analysis and ANOVAs to test for sex differences, and using correlations and binary logistic regression models to examine the contribution of independent variables to the risk of experiencing negative financial events.	Personality and Individual Differences, Elsevier	United Kingdom
40	Chris Brooks, Ivan Sangiorgi, Carola Hillenbrand, Kevin Money	Experience wears the trousers: Exploring gender and attitude to financial risk	Primary	The study utilizes the aggregate integer result from 1 to 10, termed the 'calculated ATR score', and interprets it as providing an ordinal measure of financial risk tolerance.	Journal of Economic Behavior and Organization, Elsevier (2019)	United Kingdom
41	Shlomo Benartzi and Richard H. Thaler	Heuristics and Biases in Retirement Savings Behavior	Primary and secondary	The methodology involves model building and graphical representation.	Journal of Economic Perspectives	USA
42	Olivia S Mitchell, Annamaria Lusardi (2007)	Financial Literacy and Economic Outcomes: Evidence and Policy Implications	Primary and secondary	The paper does not explicitly mention specific statistical techniques used to analyse the results of the study. Uses descriptive statistics.	*PEF, 14 (4): October, 2015. Cambridge University Press 2015*	USA
43	Annamaria Lusardi, Peter Tufano (2015)	Debt Literacy, Financial Experiences, and Over indebtedness	Primary	Factor analysis has been performed to consider financial experiences.	Journal of Behavioral Decision Making, Cambridge University press	USA
44	Carlo de Bassa Scheresberg (2013)	Financial Literacy and Financial Behavior among Young Adults: Evidence and Implications	Secondary	Multivariate regression analysis	Numeracy, Advancing Education in Quantitative Literacy	USA

45	Sarah D. Asebedo, Martin C. Seay, Kristy Archuleta & Gary Brase (2018)	The Psychological Predictors of Older Preretirees' financial self-efficacy	Secondary and primary	Ordered logistic regression model for analysis, and a Taylor series method (Wolter [1985]) was performed.	Journal of Behavioral Finance, Routledge	USA
46	F. M. De Bondt, Richard Thaler Warner (1987)	Further Evidence on Investor Overreaction and stock market seasonality	Secondary	Correlation tests and OLS regression analyses.	Wiley, Journal of finance	USA
47	Joanne W. Hsu (2015)	Aging and Strategic Learning: The Impact of Spousal Incentives on Financial Literacy	748 samples, Primary	Non parametric tests, regression analysis	Federal Reserve Board	USA
48	Annamaria Lusardi (2006)	Planning and Financial Literacy: How Do Women Fare?	1264 samples, primary	The methodology involves using probit analysis	University of Michigan, retirement research centre, Working Paper WP 2006-136	USA
49	Jere R. Behrman, Olivia S. Mitchell, Cindy K. Soo, David Bravo (2012)	How Financial Literacy Affects Household Wealth Accumulation	Primary	A two-step weighing analysis called Prdit analysis has been used. At first step weighs each question with certain degrees of weight. Each wrong question answered has greater penalty than the weight provided with a correct answer. The second step is Principal component analysis. Finally, Ordinary Least Square has been used.	American Economic Review: Papers & Proceedings 2012 02(3): 300–304 http://dx.doi.org/10.1257/aer.102.3.300	USA
50	Elke U Weber, Ann-Renee Blais, Nancy E Bettz (2002)	A Domain-Specific Risk-Attitude Scale: Measuring Risk Perceptions and Risk Behaviors	560 samples, Primary	To determine the number of factors underlying the risk behaviour judgments the Ordinary least square (OLS) exploratory factor analysis (EFA) was conducted	Wiley &Sons, Journal of Behavioural Decision Making	USA

Selection method for bibliometric analysis: -

Seventy four articles have been downloaded from the artificial intelligence Dimension AI. These articles have been studied using VOSviewer AI. VOSviewer has three visualization method and depending upon the study, visualization can be selected. The three methods are

1. **Network visualization:** Items are represented by their label. The size of the label and circle depends on the weights assigned to the item. The bigger the circle or label, the greater is the weight of the item. Lines represent links between the items
2. **Overlay visualization:** In this type of visualization, items have scores which represents the impact factor. Journals having different impact factor are represented by colours in the following way: Blue represents impact factor of the journal below 1; Green represents impact factor of the journal around 2; and Yellow represents impact factor of 3 or more.
3. **Density visualization:** Here, the greater the number of elements in the vicinity of a point, and the higher the weights of the neighbouring elements, the closer of the point is to the yellow colour.

In the study, I have studied the following: -

1. **Network analysis of co-citation with cited references:** In the VOSviewer I go to the file, click on it, then click on create button, then on choose type of data, I have chosen create a map based on bibliographic data, in the select files, I have selected csv files from Dimensions, now I have chosen type of analysis as co-citation and unit of analysis as cited references. In the counting method, I have chosen full counting method, as in case of factional counting, if there are three authors, the weightage would in fraction. There are 1282 cited references and a minimum number of citations for threshold can be chosen so that large there are a large number of network links and circles available for analysis. In the study, minimum threshold chosen is 5, and I can see that 45 articles meet the threshold. A table can be seen which can be downloaded. The table has four columns, which shows, cited references, citation and strength link. There are two clusters – red and green. A link between the two nodes means that the two articles were cited together. Now, in the left I can go to analysis tab and by clicking on it I can use the different methods. I have used association strength method; the layout and clustering can be

updated. In the visualization scale, I can increase the scale of the label so that bigger nodes become bigger and smaller nodes become smaller. Here I have three figures, Figure 1 represents network visualization of co-citation with references, Figure 2, the details of Kahneman's co-citation have been studied as it is the largest circle in the network.

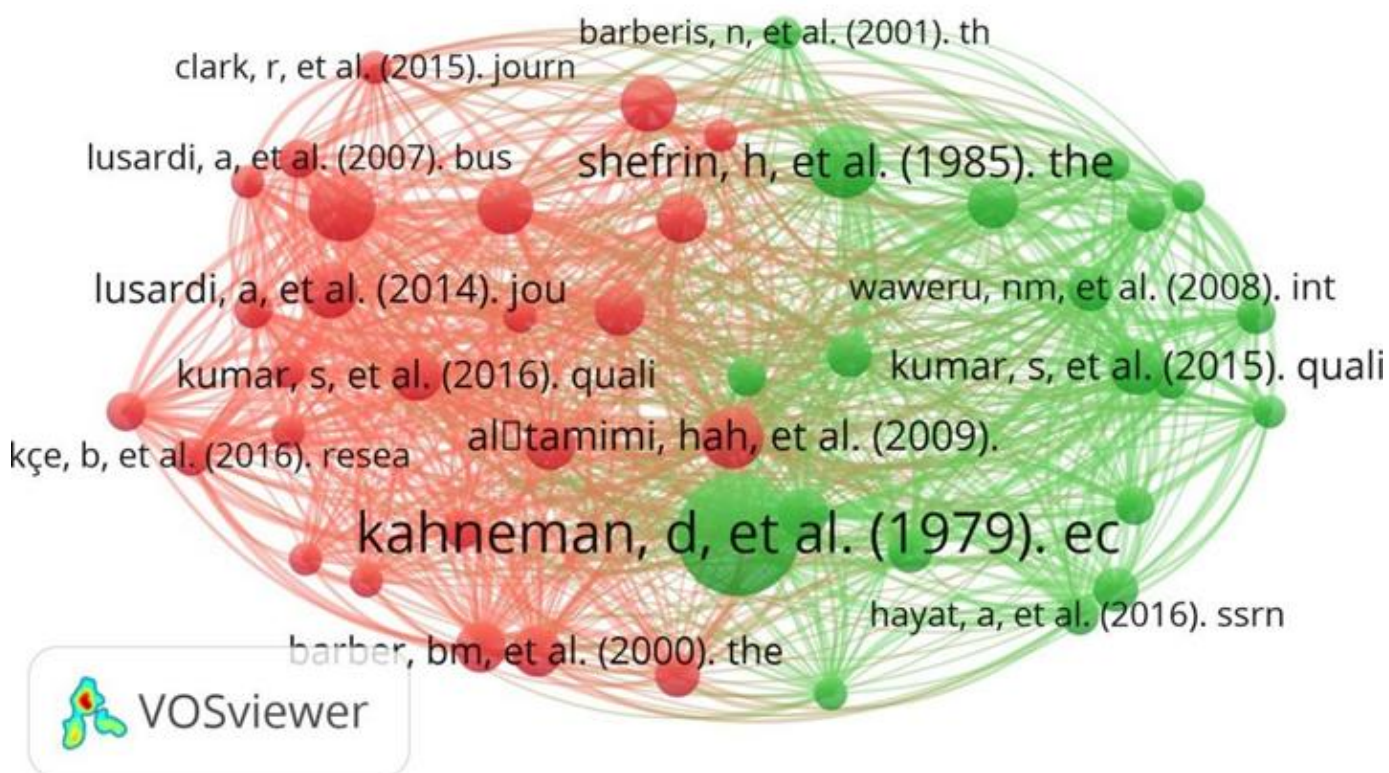**Figure 1: Network visualization of co-citation with references**

Figure 2: Kahneman's co-citation details in the co-citations with references network
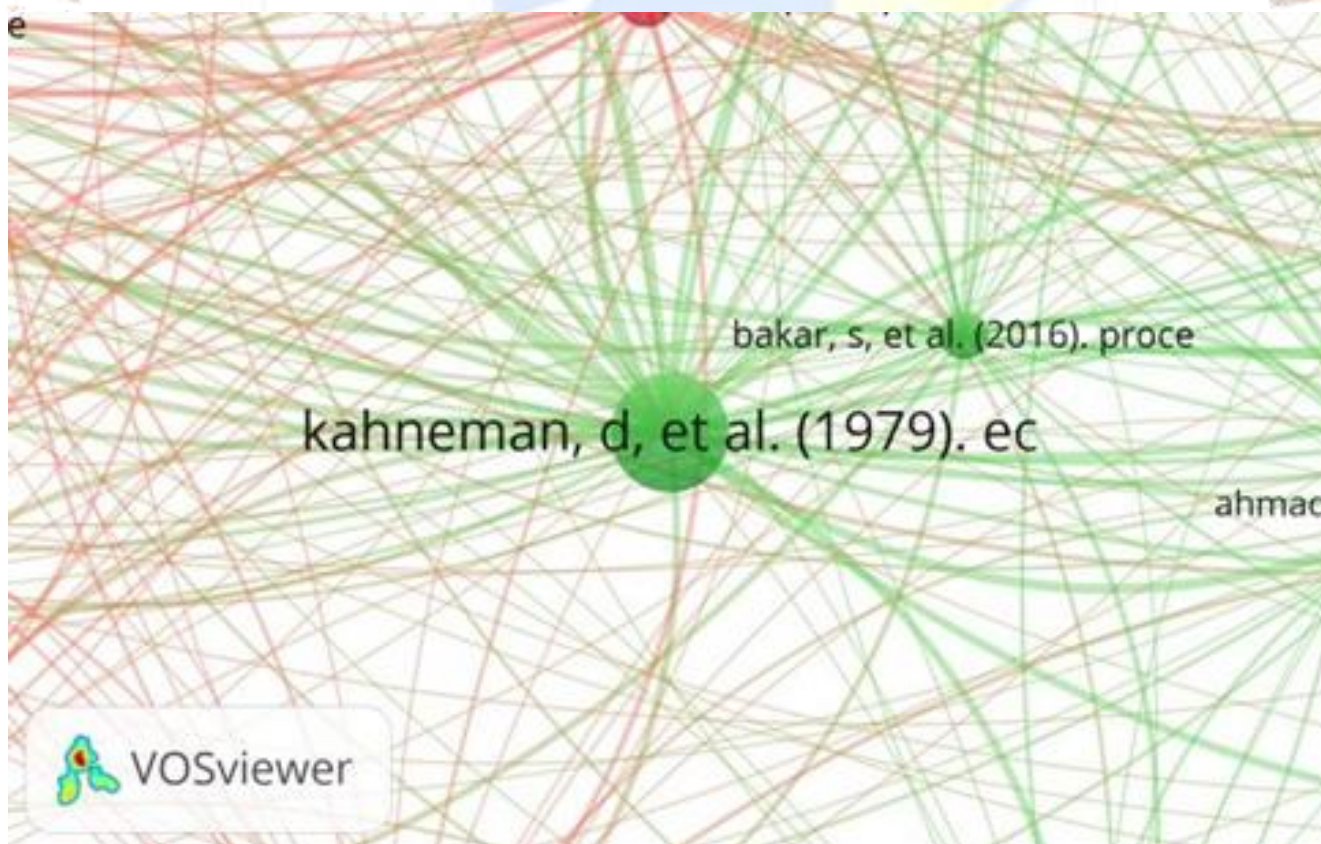
Figure 3: Al-Tamimi's co-citation details in the co-citations with references network
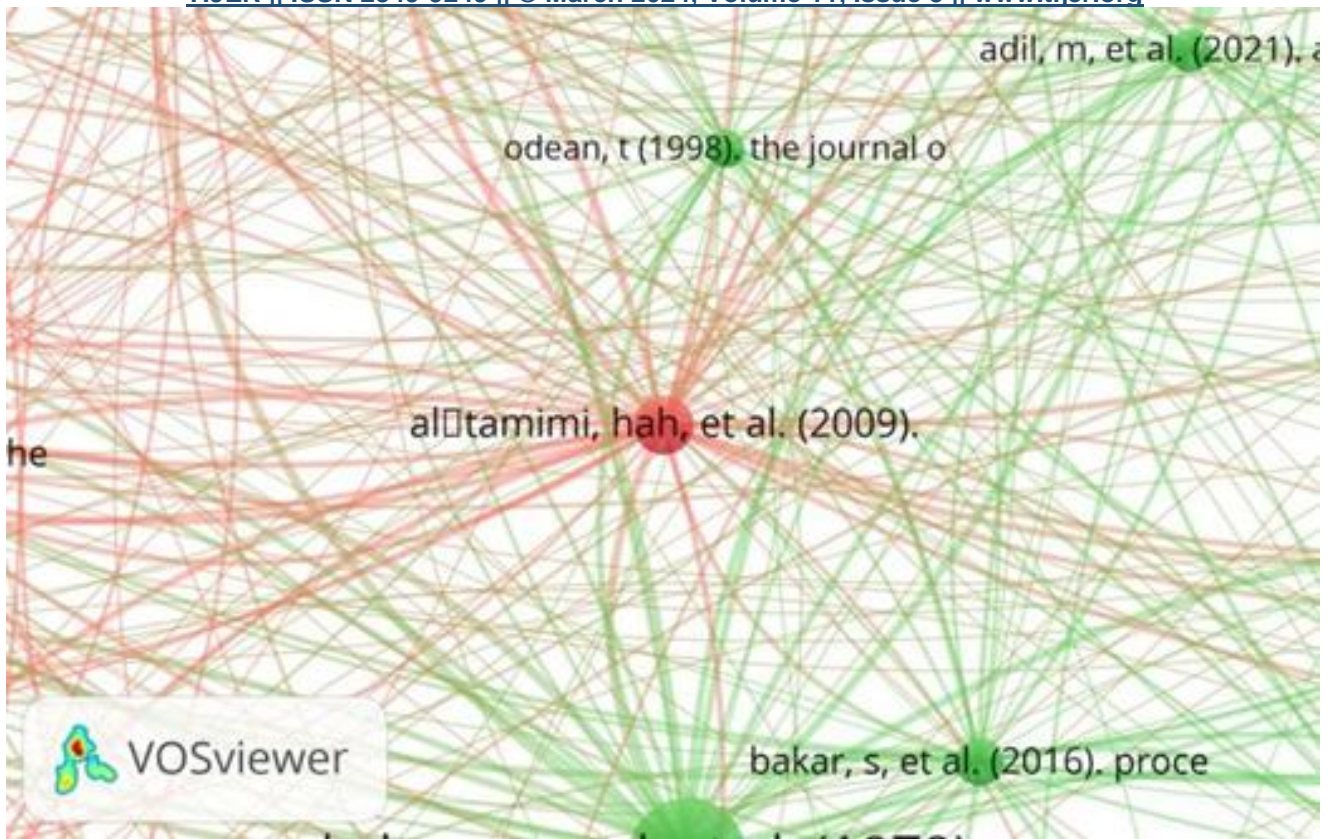
2.   **Co-authorship with countries:** In the VOSviewer, the same method is followed above, but here the minimum number of documents of a country chosen for threshold chosen is 1, minimum number of citations is zero, I see that of 20 countries, 20 meet the threshold. I see that the largest sets of connected countries are 8.
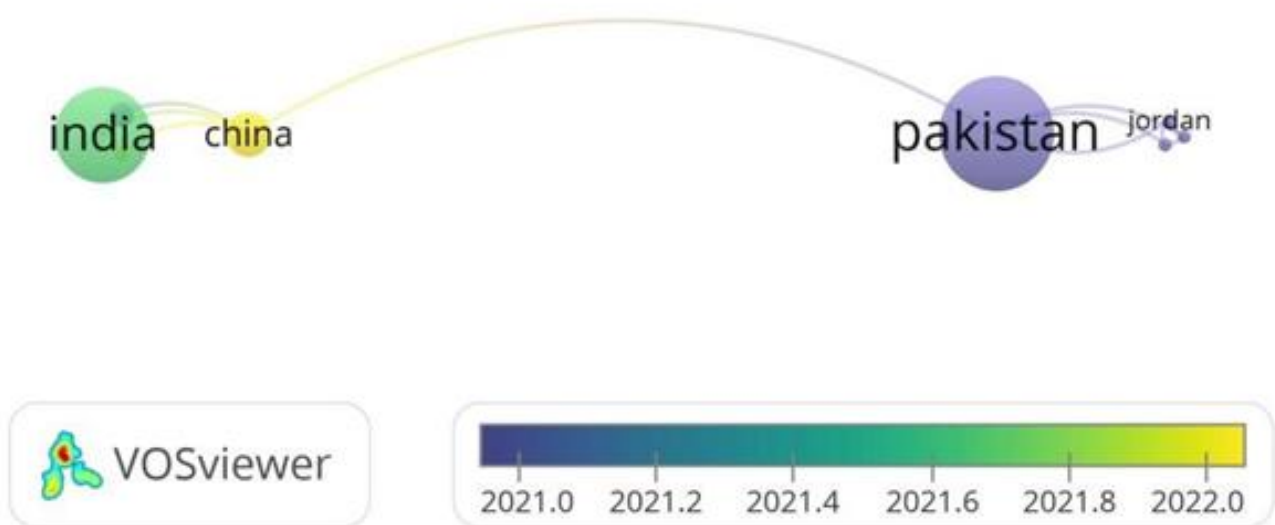
Figure 4: Co-authorship with countries

Table 3: Co-authorship with countries

Verify selected countries

Selected	Country	Documents	Citations	Total link strength ⌄
☑	india	9	161	984
☑	pakistan	11	115	811
☑	china	4	27	791
☑	united states	2	131	487
☑	bangladesh	1	11	316
☑	indonesia	6	4	272
☑	jordan	1	16	259
☑	malaysia	1	16	259
☑	russia	1	16	259
☑	turkey	2	2	129
☑	taiwan	2	32	104
☑	netherlands	2	8	92
☑	egypt	1	2	90
☑	australia	1	6	82
☑	portugal	2	2	65
☑	morocco	1	0	61
☑	tunisia	1	49	61
☑	sri lanka	1	2	52
☑	canada	1	1	16
☑	south korea	1	0	0

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RESULT AND FINDINGS

In systematic literature review, most of the articles on financial literacy and behavioural biases have pointed out the following:

1. There are behavioural biases among the investors across the countries and irrespective of the fact that they have formal education. These behavioural biases have an impact on their decision-making ability to invest.
2. Both financial knowledge and behavioural biases affects investment decision making of an investor.
3. Men have shown more knowledge in financial literacy than women in most of the studies. According to the study by Hsu, women have less financial literacy than men.
4. In most of the studies on biases, heuristic biases have a positive impact on investment decision making.
5. Most of the studies have shown that financial literacy leads to better debt management and better financial decision making
6. Negative market sentiment affects the stock volatility. Negative news creates more volatility in the stock market.
7. Stock market participation has a positive association with financial literacy.

RESULT ON BIBLIOMETRIC ANALYSIS

1. **Analysis of co-citation with cited references:** In the Co-citation with cited references analysis, in figure 1, I find the two clusters, red and green. The two clusters mean that there are two sub topics of researches that can be found during the search within the seventy four documents. There are 774 links, which means that there are 774 articles which are connected together out of 1545 links. Kanheman, d, et al. is the largest node in the study. To study further on the largest link, say Kanheman or any other papers, I go to the item tab. Figure 2, gives the details of how many papers are in each of the tab. Here, in cluster 1, there are 25 items and in cluster 2, there are 20 items, now if I want to study in details on each node, say Kanheman, d, et al. the item tab can be double clicked, I see that there are 43 links which means there are 43 co-citations, the total link strength is 169. There are 21 citations for the paper. In figure 2, on clicking Al-Tamimi (2009), I see that there have been 43 links which means that 43 papers have been co-cited and total link strength is 121, and citations for this particular paper is 10.

2. **Analysis of co-authorship with countries:** From the VOSviewer, it can be seen that there are two clusters and 8 are connected in total. The table shows that the value of some of the countries shows zero, which means that these countries do not have any common link strength with each other. If I want to study India in details, I go to item and click on India in 9. The total citations of India are 161, which is highest. It means that these three countries work together. A study on Pakistan which is in cluster 2 shows that Pakistan has 4 links i.e. with the four countries, Jordon, Malayasia, China and Russia. The total documents that they share are 11. It means that the authors from these countries work with each other. USA have links with two countries- India and China.

CONCLUSION

The study aimed to perform a systematic literature review and bibliometric analysis of nine hundred and twenty four scholarly articles from reputed journals. I found that literature on personality, knowledge, attitude and behavioural biases have been greater in number compared to other studies. In India, there has been many studies on behavioural biases, particularly overconfidence, herding. There have also been studies on financial literacy and demographic characteristics. Most of the studies across the countries have not provided any suggestions regarding what needs to be done to improve the financial literacy.

LIMITATION OF THE STUDY

Due to paucity of time, only one hundred and twenty four articles could be taken for studying.

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