DEVELOPMENT OF DYNAMIC POST-RETIREMENT FUND MANAGEMENT MODEL: ROLE OF PREPAREDNESS, PREFERENCES, AND EXPECTATIONS

Thesis Submitted for the Award of the Degree of

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in

Management

By

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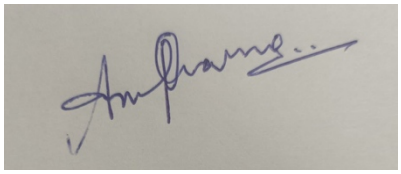
DECLARATION

I, hereby declared that the presented work in the thesis entitled "Development of Dynamic Post-Retirement Fund Management Model: Role of Preparedness, Preferences, and Expectations" in fulfilment of degree of **Doctor of Philosophy (Ph. D.)** is outcome of research work carried out by me under the supervision of Dr. Nitin Gupta, working as Professor and Head of Domain, in the Finance Domain, Mittal School of Business of Lovely Professional University, Punjab, India. In keeping with general practice of reporting scientific observations, due acknowledgements have been made whenever work described here has been based on findings of other investigator. This work has not been submitted in part or full to any other University or Institute for the award of any degree.



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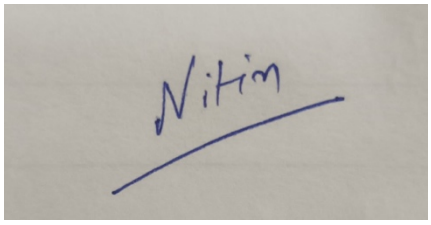
CERTIFICATE

This is to certify that the work reported in the Ph. D. thesis entitled Development of Dynamic Post-Retirement Fund Management Model: Role of Preparedness, Preferences, and Expectations" submitted in fulfillment of the requirement for the award of degree of **Doctor of Philosophy (Ph.D.)** in the Mittal School of Business, is a research work carried out by Anup Sharma, 41800303, is bonafide record of his/her original work carried out under my supervision and that no part of thesis has been submitted for any other degree, diploma or equivalent course.



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ABSTRACT

A study was proposed to understand the retirement planning scenario in India. The study was conducted with retired individuals. The study correlated the pre-retirement expectations, preferences, and preparedness levels with the post-retirement satisfaction levels of the same individuals. The mediation role of preferences and preparedness on the relationship between expectations and satisfaction was studied. Another objective of this study was to propose a retirement planning model that is dynamic in nature and can compete with existing models. A machine learning-based, self-improvising model is proposed that can be easily adopted by any financial institution to provide better fund management options to customers.

The study employed a mixed methodology, utilizing a qualitative approach for exploratory research. We identified constructs and their respective factors through a literature review, and further refined them based on inputs from focus group discussions and in-depth interviews with experts. A questionnaire designed in an exploratory study was weighted by experts from academia and relevant industry. The study was carried out in major 10 metropolitan cities and Tier-I cities, taking into account the population's preference for fund management options. Samples were collected from 448 (valid samples) retired personnel from Mumbai, Delhi, Bangalore, Hyderabad, Ahmedabad, Chennai, Kolkata, Surat, Pune, and Jaipur. 55 representatives from institutions such as ICICI Bank, SBI Bank, and LIC Pvt. Ltd., operating in the identified 10 cities, administer the Google form. Customers selected by representatives, representatives contacted by researchers's peers and industry colleagues, and colleagues contacted by researchers were as per convenience.

Proportions of samples were ensured as per quota sampling. The study successfully develops a dynamic model that considers the interplay between preparedness, preferences, and expectations. This model is designed to be adaptable, allowing retirees to modify their strategies in response to changing circumstances. Suggested model is based on machine learning model where base model is prepared from the factor loadings obtained in this study. Study has limited scope and thus, to generalize, model needs training of broader data sets. This ML model can learn from the predictions and actual scores of users, thus improvising in the process. Responses were checked and correlation was checked between these factors in all responses. Out of 483 responses, 35 responses were identified where correlation was zero for one or more of relations. These responses were removed from the dataset as there is high chance of biased and random submission in these responses. For the Indian government and

policymakers, the realization that retirement preferences significantly influence retirement satisfaction highlights the need for policies that accommodate diverse retirement needs and desires.

This study examines a comprehensive set of expectations, preparedness, preferences, and satisfaction indicators related to various life domains, each represented by specific indicators and their respective factor loadings. Key areas of focus include Financial Security & Stability Expectations, with indicators such as savings and investment (0.742) and financial security (0.7238), and Health & Mental Well-being Expectations, with physical health (0.8409) and stress management (0.8107) as prominent factors. Social & Family Engagement Expectations highlight the importance of social connections (0.8221) and family relationships (0.7611), while Leisure, Relaxation & Lifestyle Expectations emphasize leisure activities (0.8104) and maintaining a relaxed routine (0.7810). Personal-Growth, Fulfilment & Achievements Expectations are measured by personal growth (0.8115) and learning experiences (0.8531). Financial Preparedness is assessed through indicators like financial planning (0.8346) and financial resource sufficiency (0.7854), and Health Preparedness includes preventive health measures (0.8277) and curative health care (0.8507). Emotional and Social Preparedness reflects emotional readiness (0.6472) and social connections (0.6378), while Family & Legacy Preparedness examines family financial needs (0.7932) and legacy planning (0.8152). Lifestyle Preferences consider retirement lifestyle (0.8197) and community engagement (0.576), and Knowledge and Skill-Enhancement Preferences focus on continuous learning (0.7896) and skill development (0.8078). Leisure and Personal Fulfilment Preferences highlight leisure satisfaction (0.7724) and personal fulfilment (0.7366), while Financial Satisfaction is captured by financial security (0.7912) and retirement finances (0.7853). Health and Well-being Satisfaction includes overall health (0.8154) and healthcare support (0.7512), and Social Satisfaction measures social interactions (0.7645) and engagement in activities (0.7341). Lifestyle Satisfaction reflects leisure fulfilment (0.7499) and personal time balance (0.7441), while Life Purpose and Fulfillment focuses on personal achievements (0.7551) and goal progress (0.7548).

This analysis provides valuable insights into the factors influencing overall life satisfaction and preparedness across various dimensions. These advanced models leverage vast amounts of data and sophisticated algorithms to offer more personalized, accurate, and dynamic financial planning solutions. Unlike traditional models that often rely on static assumptions and generalized predictions, machine learning models can continuously learn and adapt to changing market conditions, individual behaviors, and evolving economic scenarios. This adaptability is

crucial in a country like India, where economic conditions, life expectancy, healthcare costs, and individual financial needs vary widely across different demographics.

Moreover, machine learning models can significantly improve risk management in retirement planning. Traditional models often use historical data to predict future trends, which can be unreliable in the face of market volatility and economic uncertainties. In contrast, machine learning algorithms can analyze real-time data and identify patterns and correlations that may not be evident through conventional analysis. This allows for better forecasting of market trends, inflation rates, and other critical factors, enabling retirees to make more informed investment decisions. By dynamically adjusting to market conditions, these models can help mitigate risks and protect the financial stability of retirees, especially in times of economic downturns.

Another significant implication is the democratization of financial planning services. Machine learning-based platforms can provide high-quality financial advice at a fraction of the cost of traditional financial advisors. This is particularly important in India, where a large portion of the population may not have access to professional financial planning services due to cost constraints. By making sophisticated retirement planning tools available to a broader audience, these models can help bridge the gap between different socio-economic groups, ensuring that more people can secure their financial futures.

Furthermore, the integration of machine learning in retirement planning can enhance the engagement and financial literacy of the retired population. Interactive platforms powered by machine learning can offer intuitive user experiences, making it easier for retirees to understand and manage their retirement plans. These platforms can provide continuous feedback and updates, helping retirees stay informed about their financial status and make necessary adjustments to their plans. Increased engagement and awareness can lead to better financial decisions and ultimately, a more secure and fulfilling retirement.

The study concluded by establishing the partial mediation of retirement preference and retirement preparedness on the relationship between retirement expectations and retirement satisfaction. A machine learning-based model is proposed and explained with an example. The study sets a path for further integration of technology to make this model highly adaptable and autonomous through integrations.

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ABBREVATION	FULL FORM
e	Variance expected in the result. 0.05 is the tolerance level in the present study
(1- p)	Probability of non –occurrence of any event
CI	confidence Interval
ESP	Emotional and Social Preparedness
FLP	Family & Legacy Preparedness
FP	Financial Preparedness
FS	Financial satisfaction
FSSE	Financial Security & Stability Expectations
HMWE	Health & Mental Well-being Expectations
HP	Health Preparedness
HWS	Health and Well-being Satisfaction
KSP	Knowledge and Skill-Enhancement Preferences
LP	Lifestyle Preferences
LPF	Life Purpose and Fulfillment
LPFP	Leisure and Personal Fulfilment Preferences
LRLE	Leisure, Relaxation & Lifestyle Expectations
LS	Lifestyle Satisfaction
n	Sample size
p	probability of occurrence of any event expressed as a percentage
PFAE	Personal-Growth, Fulfilment & Achievements Expectations
SFEE	Social & Family Engagement Expectations
SS	Social Satisfaction
Z	Confidence level that determine the level of error

LIST OF ANNEXURES

Chapter - 1

INTRODUCTION

Chapter Orientation

The Introduction serves as the foundational pillar of the thesis, establishing the context, rationale, and scope of the study on retirement planning with a special focus on the Indian context. The chapter unfolds in a logical sequence, beginning with a conceptual overview of retirement and its evolution over time, both globally and within India. It outlines how retirement has transitioned from being a stage significant financial preparedness, strategic planning, and active engagement. This transformation is attributed to undergoing rapid socio-economic change.

The initial sections introduce various **theoretical models** that have shaped the understanding of retirement planning. These include seminal economic theories such as the life cycle hypothesis, and asset allocation. Alongside, psychological and behavioural theories—including behavioural economics, human capital theory, and stochastic models—highlight how cognitive, emotional, and risk-related factors influence individuals' retirement decisions. These frameworks are critical in forming a theoretical scaffold for the thesis, offering multidimensional insight into how retirement readiness and satisfaction are conceptualised and measured.

The chapter then delves into Public Provident Fund (PPF), and the National Pension System (NPS). These schemes reflect India's response to changing family structures and employment landscapes, particularly the emergence of nuclear families and the rise of informal and gig-based employment. The discussion emphasises how economic liberalisation, financial inclusion efforts, and policy reforms have gradually widened access to retirement savings mechanisms, yet large segments of the workforce remain undercovered.

Following the Indian context, the chapter explores **comparative global retirement models** from countries like the Netherlands, Sweden, Denmark, Switzerland, and Australia. Each model is sharing approach, and outcomes. For instance, the Netherlands' three-pillar model combines state pensions, occupational schemes, and private savings, while Singapore's CPF system integrates housing, healthcare, and retirement into a single fund. These international comparisons serve two purposes: they establish benchmarks for evaluating India's system and inspire recommendations for

improving inclusiveness, efficiency, and sustainability in Indian retirement planning frameworks.

The chapter further addresses the **impact of shifting demographics and economic realities** in India. An ageing population, declining fertility, and the breakdown of traditional caregiving structures signal the need for urgent policy action. Concurrently, inflation, income disparity, and inconsistent access to formal retirement options compound the challenge. These demographic and economic changes retirement planning strategies that are not only financially sound but also socially and culturally responsive.

Against this backdrop, the chapter discusses recent **advancements in retirement planning tools and instruments**. The rise of mutual funds, health insurance products for senior citizens, reverse mortgage schemes, and technology-driven platforms like robo-advisors has begun to redefine the retirement planning landscape. These innovations, coupled with digital financial literacy initiatives, are gradually enabling individuals to adopt more informed and retirement strategies. However, the digital divide and low financial literacy among large sections of the population remain formidable barriers.

The role of **government policies and financial institutions** is also explored in detail. Schemes such as the Atal Pension Yojana (APY), Pradhan Mantri Vaya Vandana Yojana, and Jan Dhan Yojana represent steps toward greater inclusion. Meanwhile, banks, insurance companies, and mutual fund houses have introduced retirement-specific products tailored to the needs of a growing middle class. The chapter underscores the collaborative potential between public and private institutions in building a holistic retirement planning ecosystem.

A significant portion of the chapter is devoted to the **concept of retirement satisfaction**, defined not merely by financial sufficiency but by overall well-being, health, social connectedness, and personal fulfilment. The discussion incorporates theoretical frameworks like role theory, continuity theory, and the life course perspective, which help explain how retirees transition from work to leisure and how factors such as health, identity, and purpose influence their post-retirement quality of life. This multidimensional view is essential for redefining the goalposts of retirement planning beyond income replacement.

Closely tied to retirement satisfaction is the idea of **retirement preparedness**, which includes financial readiness, emotional resilience, social networks, and health status. The chapter outlines how various factors across the life span contribute to preparedness. It draws upon theories such as the resource-based dynamic perspective, self-determination theory, and . The discussion highlights the importance of early and continuous planning to adapt to life events and changing goals.

The concept of **retirement preferences** is also elaborated, recognising that retirement is no longer a one-size-fits-all experience. Preferences regarding retirement age, post-retirement activities, and lifestyle aspirations vary significantly across individuals. The chapter employs rational choice theory, socioemotional selectivity theory, and expectancy theory to explain how individuals formulate and adjust their retirement goals. These preferences are shaped by personal values, economic constraints, and social contexts, indicating the need for more retirement planning models.

In the final sections, the chapter traces the **evolution of retirement planning models**, illustrating how the field has moved from deterministic economic models to adaptive, data-driven systems. The emergence of dynamic programming models and lifecycle investing models reflects the increasing complexity of retirement planning in the face of uncertainty and market volatility. The integration of **machine learning and big data analytics** marks a cutting-edge shift, enabling predictive modelling, personalisation, and real-time decision-making. These innovations offer promising avenues for the development of intelligent, responsive retirement planning systems tailored to individual profiles and needs.

In conclusion, Chapter 1 provides a comprehensive introduction to the multifaceted domain of retirement planning. By combining conceptual clarity, theoretical depth, empirical insight, and policy analysis, the chapter lays a robust foundation for the thesis. It sets the stage for exploring the core research questions and objectives that guide the subsequent chapters. It also highlights the significance of contextualising retirement planning within broader socio-economic, cultural, and technological changes. This orientation prepares the reader for a engagement with the study and underscores the relevance and timeliness of addressing retirement planning as a critical public and personal concern in contemporary India.

Chapter - 1

INTRODUCTION

Retirement is a significant phase in an individual's life, marking a transition from a career-driven existence to a period of personal freedom and reflection. In India, this transition is becoming increasingly complex due to evolving socio-economic factors, changing demographics, and advancements in financial planning. As the traditional paradigms of retirement planning shift, it becomes crucial to understand how these changes impact retirees and how they can navigate this phase effectively.

Retirement, traditionally understood as the phase of life where an individual ceases full-time employment permanently, has evolved significantly in its meaning and implications over time. Initially, retirement was primarily associated with a withdrawal from the often mandated by societal norms or governmental policies. It marked a transition into a period of rest and leisure, supported by savings or pensions. However, the concept of retirement has undergone profound changes influenced by demographic shifts, economic developments, and changing social attitudes. Today, retirement is increasingly viewed as a flexible, journey rather than a one-time event. Factors such as improved healthcare, increased life expectancy, and evolving career trajectories have contributed to a more dynamic understanding of retirement. Many individuals now transition gradually into retirement through part-time work, consultancy, or phased retirement, reflecting a desire to stay active and engaged while enjoying greater personal freedom.

Globally, retirement options have diversified to accommodate varying cultural, economic, and personal preferences. In many Western countries, traditional pension systems still play a significant role, though the shift individual responsibility for retirement savings. Conversely, in countries like Japan and Germany, state-sponsored pension schemes continue to provide substantial support, although these systems face sustainability challenges due to ageing populations. In developing countries, informal retirement options often prevail, with family support systems playing a crucial role. Additionally, some countries have embraced innovative retirement models. For instance, the Netherlands employs a three-pillar system combining state pensions, occupational pensions, and private savings, ensuring a balanced and robust retirement

framework. Scandinavian countries, known for their comprehensive welfare states, offer flexible retirement ages and generous social security benefits, promoting a high quality of life for retirees.

Several theories and models have been developed to understand and improve retirement planning and satisfaction. The Life Cycle Hypothesis (LCH), introduced by Franco Modigliani and Richard Brumberg in the 1950s, posits that individuals plan their consumption and savings to maintain a stable consumption pattern. This model laid the foundation for subsequent retirement planning theories by . Human Capital Theory, advanced by Gary Becker, highlights the role of education and skills in enhancing earning capacity and retirement readiness. It underscores the long-term benefits of investing in human capital, linking higher lifetime earnings to better retirement outcomes.

The Permanent Income Hypothesis (PIH), developed by Milton Friedman, further refines this understanding by suggesting that individuals base their consumption decisions on expected long-term average income, rather than current income. This theory emphasises the role of long-term income expectations in shaping savings behaviour, aligning with the principles of the life cycle hypothesis. Behavioural economics introduces a psychological dimension to retirement planning, with researchers like Richard Thaler exploring how cognitive biases and heuristics affect financial decisions. Concepts such as mental accounting and loss aversion highlight the psychological barriers to effective retirement savings and the need for policy interventions to guide better financial behaviour.

In addition to these foundational theories, Modern Portfolio Theory (MPT), introduced by Harry Markowitz, significantly influences retirement planning by focusing on the trade-off between risk and return. This quantitative approach to asset allocation helps retirees design investment portfolios that a given level of risk.

Stochastic models, such as those proposed by James Poterba and David Wise, incorporate probabilistic approaches to account for uncertainties and risks in retirement planning, providing more realistic simulations of retirement outcomes.

Recently, dynamic programming models have leveraged advancements in computational power to solve complex retirement planning problems and offer personalised solutions by continuously updating and optimising decisions based on

changing circumstances. Furthermore, the latest advancement is the integration of machine learning and big data analytics, which enables the analysis of vast amounts of data to uncover patterns and trends that inform highly tailored retirement solutions.

1.1 Need for the Study in India in Present Times

The urgent need to develop a dynamic post-retirement fund management model in India arises from the country's demographic transition, rising life expectancy, insufficient financial preparedness among retirees, and evolving retirement expectations. This study addresses critical gaps in post-retirement financial planning, aligning with contemporary socio-economic challenges.

1.1.1 Rapid Ageing of India's Population

India is witnessing a demographic shift toward an ageing population. According to the National Statistical Office (NSO), the elderly population (aged 60 and above) in India was 138 million in 2021 and is projected to rise to 194 million by 2031, constituting about 13.1% of the total population (National Statistical Office, 2021). This increase underscores the urgency for robust, adaptable post-retirement financial strategies to support a longer retirement phase.

1.1.2. Inadequate Retirement Preparedness

Most Indian retirees lack adequate savings to sustain themselves post-retirement. A 2023 HSBC Global Retirement Survey found that only 33% of Indians believe they are financially prepared for retirement, and nearly 47% fear they will outlive their savings (HSBC Life, 2023). The India Retirement Index Study (IRIS) 4.0, conducted by Max Life Insurance in partnership with Kantar, revealed that 40% of Indians have not started retirement planning, 61% worry that their savings will deplete within 10 years of retirement, 80% believe they will be healthy during retirement, and 58% have undergone health check-ups in the past three years (Max Life Insurance & Kantar, 2023).

1.1.3. Dominance of Fixed-Income and Traditional Assets

Retirement fund management in India heavily depends on fixed deposits, gold, and real estate. According to AMFI (2023) market-linked instruments like mutual funds or the National Pension System (NPS) for long-term financial management. This static approach fails to combat inflation and longevity risk, necessitating a dynamic,

diversified fund management model that evolves with changing needs and market conditions.

1.1.4. Longevity and Healthcare Costs

Life expectancy in India has increased to 70.9 years in 2023 and is expected to exceed 75 years by 2050 (United Nations, 2024). Meanwhile, healthcare inflation in India is among the highest in the world at 14% annually (Ministry of Finance, 2023). Rising medical costs require a dynamic post-retirement model that , especially for health-related expenses.

1.1.5. Changing Retirement Preferences and Expectations

Modern retirees are redefining retirement—not just as a time of rest but of active engagement. A Deloitte (2022) survey found that nearly 30% of Indian retirees are considering part-time work or entrepreneurship post-retirement. Preferences now include financial independence, health security, lifestyle maintenance, and personal fulfilment. These evolving aspirations necessitate management frameworks.

1.1.6. Policy Gaps and Informal Sector Exclusion

Despite initiatives like NPS and Atal Pension Yojana, over 80% of India's workforce in the informal sector lacks formal pension coverage (International Labour Organisation, 2021).

1.2 The Evolution of Retirement Planning in India

The concept of retirement planning has evolved significantly in India over the past few decades, reflecting broader socio-economic changes and shifting perspectives on ageing and financial security. Traditionally, retirement was viewed through the lens of family support and religious duty, with the expectation that children would take care of their elderly parents. However, as India has rapidly transformed, the approach to retirement planning has undergone a profound metamorphosis. This evolution highlights a complex cultural expectations, economic development, and policy interventions, shaping the current landscape of retirement preparedness in the country. Historically, the notion of retirement in India was closely tied to the joint family system, where elders were cared for by their offspring within a familial home. This arrangement provided a sense of security and continuity, grounded in cultural values that and respect for elders. In rural areas, where joint families were more common, this system worked relatively well, as the collective resources of the family supported the elderly. The

elders' role within the family was both respected and integrated into the household's economic structure, often ensuring a relatively stable and dignified old age.

However, as India began its journey of modernisation and economic liberalisation in the late 20th century, several factors began to challenge this traditional model. nuclear families created a new social dynamic where the extended family system was less prevalent. Economic opportunities in cities attracted younger generations, leading to a gradual disintegration of the joint family structure. This shift necessitated a reevaluation of retirement planning, as the safety net provided by the extended family was no longer as robust or reliable.

In response to these the need for formal retirement planning mechanisms. The 20th century saw the introduction and evolution of several key retirement schemes aimed at providing financial security to individuals post-retirement. One of the earliest institutional responses was the Employees' Provident Fund (EPF), established in 1952. The EPF, initially designed for formal sector employees, represented a significant shift from the traditional reliance on family support to a more structured, government-backed system of retirement savings.

The EPF scheme mandated contributions from both employers and employees, creating a corpus of funds that would be accessible upon retirement. This system not only encouraged savings among employees but also introduced a level of predictability and financial planning that was previously absent. Over time, the EPF was complemented by other schemes such as the Employees' Pension Scheme (EPS) and the Public Provident Fund (PPF), each contributing to a more comprehensive framework for retirement savings.

As the Indian economy continued to grow and diversify, the need for retirement planning expanded beyond the formal sector. The emergence of the private sector and the rise of self-employment created a new demographic of workers who were not covered by traditional pension schemes. this gap, the Indian government introduced the National Pension System (NPS) in 2004. The NPS aimed to provide a structured retirement savings platform for individuals across various employment categories, including the self-employed and those in the informal sector. By offering a flexible, market-linked investment approach, the NPS sought to cater to a broader audience and address the diverse needs of a rapidly evolving workforce.

The NPS represented a significant departure from earlier pension schemes by introducing a defined contribution model, where the amount of retirement benefits was directly linked to the contributions made and the performance of investments. This model offered greater flexibility and potential for higher returns but also introduced a degree of uncertainty, as retirees' financial security was dependent on market performance.

The 21st century has witnessed further advancements in retirement planning, driven by technological innovations and evolving financial products. The growth of financial literacy and awareness has contemporary retirement planning practices. With increased access to information and financial tools, individuals are now more empowered to make informed decisions about their retirement savings and investment strategies. The proliferation of mutual funds, insurance products, and digital financial platforms has expanded the range of options available to retirees, allowing them to tailor their retirement plans according to their specific needs and goals.

In recent years, there has been a growing emphasis on retirement planning among the middle and upper-middle classes, driven by rising incomes and changing attitudes financial security. The introduction of retirement-focused financial products, such as retirement plans offered by insurance companies and mutual funds, has further contributed to this trend. These products offer a range of features designed to address the unique needs of retirees, including annuities, systematic withdrawal plans, and tax-advantaged savings accounts.

Despite these advancements, challenges remain in the realm of retirement planning in India. The informal sector, which constitutes a significant portion of the workforce, continues to lack access to formal retirement benefits. Additionally, disparities in financial literacy and access to financial services persist, particularly among lower-income groups and rural populations. Addressing these challenges requires continued efforts to enhance financial education, expand coverage, and develop inclusive retirement planning solutions that cater to the diverse needs of India's population.

1.3 Global Unique Retirement Planning Models

In this section, retirement planning models for some countries (the Netherlands, Sweden, Denmark, Switzerland, Italy, Japan, Australia, Singapore, Chile, South Africa, Canada, Brazil, and India) are summarised. This selection was guided by the diversity

and innovation of their retirement planning models. These nations represent a spectrum of socio-economic contexts, from highly developed welfare states (e.g., Sweden, Denmark, Netherlands) with multi-pillar systems to emerging economies (e.g., Brazil, India, South Africa) with evolving pension structures. Countries like Australia and Chile are globally populations (OECD, 2023). Singapore and Switzerland offer hybrid systems balancing state and personal savings effectively (World Bank, 2025). These countries were selected for comparative studies because of the following reasons:

Benchmark Performers (Netherlands, Sweden, Denmark, Switzerland)

their consistent top rankings in the Mercer CFA Institute Global Pension Index (2022). The Netherlands, Iceland, and Denmark scored the highest globally, with values above 85 (A-grade), indicating strong sustainability, adequacy, and integrity. Sweden and Switzerland also received high B+ or A- ratings in past years. Other nations with strong pension systems (e.g., Iceland, Norway) were considered, but the Netherlands, Sweden, and Denmark represent longstanding models combining pay-as-you-go and funded components and are more widely studied and documented in global literature (OECD, Mercer, World Bank). Thus, these countries act as reference models due to international consensus on their excellence and policy transparency.

Innovative or Hybrid

Singapore's Central Provident Fund (CPF) is unique globally in its integration of retirement, housing, and healthcare savings, with mandatory contributions and low government liability. Australia's superannuation guarantee system mandates employer contributions (11% as of 2023), fostering private wealth accumulation, making it a standout in funded models. Japan faces the world's oldest population, and its reforms offer insights into adapting pension systems to demographic shifts, such as integrating non-contributory benefits and increasing retirement age. Other countries may have innovative traits, but these three are widely cited in global pension policy literature (OECD, ILO, IMF) for their comprehensive and unique approaches to system design and demographic alignment.

Reform-Driven or Transitional Systems (Chile, Italy, Brazil)

Chile pioneered the shift to a fully contribution system in 1981—making it a global case study despite current critiques. Italy has undergone deep pension reforms over two decades, aiming to balance generosity with sustainability, especially under

demographic pressure. Brazil implemented significant constitutional changes in 2019, raising retirement ages and tightening benefits—a model for pension reform in upper-middle-income countries. These countries were chosen over others (e.g., Greece, Argentina) because of the scale, clarity of policy impact, and availability of longitudinal data (World Bank, IMF, ISSA), making them more suitable for academic comparison.

Emerging Economies with Inclusive Goals (India, South Africa)

India offers a diverse mix of contributory and non-contributory schemes, addressing both formal and informal sectors (e.g., NPS, EPFO, Atal Pension Yojana). South Africa has one of the most inclusive tax-funded old-age grant systems in the developing world, covering over 90% of older people without formal pension coverage (ILO, 2022). These countries represent developing contexts grappling with coverage, adequacy, and informality. Other low- or middle-income countries (e.g., Kenya, Bangladesh) lack the same data availability, policy maturity, or comparative policy frameworks for robust academic analysis.

North American Balanced System (Canada)

Canada was selected over the U.S. because its Canada Pension Plan (CPP) and Old Age Security (OAS) provide universality, progressivity, and sustainability. The U.S. system, while large, faces solvency concerns and a more fragmented structure. Canada ranks higher in the Mercer Index (2022: B rating) and OECD adequacy measures. Hence, Canada represents a balanced, well-governed system among major economies.

This cross-continental selection ensures representation from North America, Europe, Asia, Latin America, and Africa, enabling a comparative study that captures a wide array of policy approaches, coverage levels, and fiscal sustainability strategies (International Labour Organisation, 2021).

1.3.1 Netherlands

The Netherlands is well recognised for its strong and all-encompassing retirement system, always acknowledged as one of the top systems globally. : the state pension (AOW), occupational pensions, and private savings. The state pension offers a fundamental income to every citizen, financed by a pay-as-you-go mechanism involving incumbent employees. The occupational pension system is pre-retirement income. The administration of these pensions is carried out by industry-wide pension funds, which consolidate risks and resources from several businesses, leading to

reduced expenses and increased effectiveness. Furthermore, there is a significant focus on private savings, promoted by advantageous tax policies. The success of the Dutch system can be attributed to its extensive coverage, risk-sharing arrangements, and the integration of public and private sectors, which provide a superior quality of life for retirees (Source: European Commission).

1.3.2 Sweden

The retirement planning model in Sweden is a quite adaptable and enduring framework that integrates public pensions with employment and individual savings. A public pension system comprises two primary elements: the income pension and the premium pension. An income pension is a theoretical system of defined contributions in which benefits are determined by lifetime earnings, taking into account projected life expectancy. The premium pension enables individuals to allocate a fraction of their payroll taxes into private accounts, therefore granting them autonomy over their retirement funding. The aforementioned strategy fosters the development of financial literacy and personal accountability. Industrial pensions are prevalent, established through collective bargaining and offering significant supplementary earnings. Sweden's flexible retirement age provision promotes extended working lives by offering financial incentives to postpone retirement. The adaptability, transparency, and capacity to reconcile individual choice with social security are key features that this system is highly acclaimed for (Source: European Commission).

1.3.3 Denmark

The retirement system in Denmark is designed based on the concepts of universal welfare and financial stability, incorporating a combination of public and private benefits. The public pension, often known as the Folkpension, is a fundamental state pension financed by general taxes, which furnishes a guaranteed income to all retired individuals. is augmented by the ATP (Labour Market Supplementary Pension), a compulsory program financed by payments from both employers and employees, which offers supplementary income on the basis of contributions made over one's career. Occupational pension systems are established by collective bargaining and provide coverage for a substantial proportion of the a substantially high percentage of income replacement before retirement. Furthermore, tax incentives are provided to promote private savings, therefore enabling individuals to enhance their retirement accounts

even more. Denmark's approach is universally praised for its inclusiveness, guaranteeing that every citizen, irrespective of their income or work background, has access to sufficient retirement income (Source: European Commission).

1.3.4 Switzerland

Switzerland's retirement system is by its unique three-pillar structure, which combines public, occupational, and private pension services. In the first pillar, AHV/AVS, a public pension is established to provide a fundamental income financed by payroll taxes and general taxation. guarantees a basic level of economic well-being for all retired individuals. The second pillar is the compulsory occupational pension scheme (BVG/LPP), structured on a fully financed model in which both employers and employees make contributions to pension funds. guarantee financial stability and expert management, these funds are overseen by independent institutions. The third pillar voluntary contributions. By providing flexibility, this approach enables individuals to decide how to distribute their savings and investments. Switzerland's approach is commended for its harmonious integration of government support and private enterprise, resulting in a well-established degree of financial stability for retired individuals (Source: European Commission).

1.3.5 Italy

Italy has implemented substantial changes to its retirement system tackle concerns related to sustainability and adequacy, leading to the development of a distinctive hybrid model. Mostly financed by payroll taxes, the public pension system provides benefits determined by career-long contributions and average earnings. The latest legislative changes have implemented components of a theoretically defined contribution system, which establishes a stronger connection between benefits and both contributions and life expectancy. guarantees long-term financial viability and equity and justice over successive generations. Although occupational pensions are still optional, they are being increasingly promoted through tax incentives that encourage employers and employees to contribute to additional pension plans. customised investment methods and risk management. Italy's strategy is to harmonise the conventional social security system with contemporary, environmentally friendly methods, guaranteeing that pensioners secure sufficient income while upholding fiscal prudence (Source: European Commission).

1.3.6 Japan

The retirement system in Japan is a multi-tiered scheme specifically developed to tackle the difficulties presented by its exponentially ageing population. The initial layer is the National Pension (Kokumin Nenkin), which offers a fundamental, uniform pension to all inhabitants, financed by predetermined contributions from people and government subsidies. The second layer is the Employees' Pension Insurance (Kosei Nenkin), which is compulsory for salary-based employees. It offers benefits according to wages that are financed by payroll contributions made by both employers and employees. Furthermore, Japan has a range of private pension systems, such as company pensions and personal pension plans, that provide tax benefits to promote voluntary savings. Japanese authorities have implemented measures to address demographic concerns, including increasing the retirement age and modifying benefit formulas to guarantee long-term viability. The objective of the scheme is to offer : Japan Pension Services).

1.3.7 Australia

The retirement system in Australia, frequently referred to as the "three-pillar" model, is distinguished by its focus on mandatory savings. The first pillar is the age pension, a benefit that is determined by means testing and is financed by general taxation. It serves as a safety net for individuals with restricted financial means. The second important component is the Superannuation Guarantee, which requires employers to make contributions to private superannuation accounts on behalf of their employees. This system is subject to robust regulation, guaranteeing the responsible and transparent management of finances. The third pillar comprises voluntary savings, which encompass supplementary superannuation contributions and other private investments. Tax incentives motivate Australians to increase their retirement savings. This approach integrates a public safety net with a deliberate focus on individual savings, therefore guaranteeing the sufficiency and long-term viability of retirement incomes (Source: Services Australia).

1.3.8 Singapore

The bedrock of Singapore's retirement planning strategy is the Central Provident Fund (CPF), an all-encompassing mandatory savings program. The Comprehensive Provident Fund (CPF) encompasses three main components of social security: retirement, healthcare, and housing. The CPF requires compulsory contributions from

both employers and employees. The monies are allocated into three accounts: the Ordinary Account for housing and education, the Special Account for retirement savings, and the Medisave Account for medical costs. Once individuals reach the age of 55, they have the option to move their savings into the Retirement Account, which offers a regular monthly return during their retirement. The CPF system offers maximum flexibility, enabling individuals to allocate their assets for diverse objectives while guaranteeing a stable retirement income. The model adopted by Singapore is highly acclaimed for its effective incorporation of social security requirements and its capacity to adjust to evolving economic circumstances. (Source: Ministry of Manpower, Singapore)

1.3.9 Chile

Chile implemented a widely recognised retirement system in 1981, known for its completely privatised and defined contribution scheme. This system mandates that employees must allocate a percentage of their income to personal retirement accounts overseen by private pension fund administrators (AFPs). The contributed funds are allocated to a diverse range of financial assets, aiming to optimise returns. In addition, the system includes a minimum pension guarantee for individuals who have made contributions for a minimum of 20 years but whose accumulated resources are not enough to yield a satisfactory income. Moreover, Chile has implemented a Solidarity Pension System to establish a financial support system for with low incomes who have been unable to accumulate sufficient savings. This approach has served as a catalyst for changes in other nations and is commended for its focus on individual accountability and market-orientated administration; however, it is subject to criticism for its sufficiency and potential deficiencies in coverage (Source: Social Security Office of Retirement and Disability Policy, Chile).

1.3.10 South Africa

The pension planning system in South Africa is distinguished by its integration of public and private provisions, specifically designed to suit the varied socio-economic environment. An Old Age Grant is a means-tested benefit provided by the state, which is financed by general taxation. Its purpose is to guarantee a minimum income for the elderly who satisfy the specified criteria. Furthermore, there exists a highly advanced private pension industry, encompassing both occupational and personal pension

schemes. A multitude of employers provide defined contribution plans, which are augmented by voluntary individual savings that are promoted through tax incentives. The eligibility criteria for receiving the Old Age Grant is being aged 60, and recent changes have been implemented to enhance the long-term viability and inclusiveness of the system. South Africa's approach is to achieve a harmonious equilibrium between social welfare and private sector efficiency, catering to the requirements of both low-income wage earners and the wealthier sectors of the population (Source: Government Pensions Administration Agency, Republic of South Africa).

1.3.11 Canada

The retirement system in Canada incorporates a combination of public and private components, strategically developed to offer extensive coverage. The initial component is the Old Age Security (OAS) program, a comprehensive benefit financed by public taxes that offers predetermined income to all elderly individuals. The Canada Pension Plan (CPP) and the Quebec Pension Plan (QPP) are obligatory systems that are tied to earnings and are financed by contributions made by employers and employees. These plans provide benefits for retirement, disability, and survivors. In addition, Canada promotes private savings by offering tax-advantaged instruments including Registered Retirement Savings Plans (RRSPs) and Tax-Free Savings Accounts (TFSAs). These accounts enable individuals to accumulate funds for retirement while simultaneously enjoying substantial tax advantages. An outstanding feature of Canada's system is its ability to strike a harmonious equilibrium between a robust public safety net and incentives for private savings, therefore guaranteeing a secure and varied retirement income for its population (Source: Public Pensions, Government of Canada).

1.3.12 Brazil

Brazil's retirement system has been extensively reformed to tackle concerns about financial viability and broaden coverage. The system includes a publicly funded pay-as-you-go program that offers benefits on the basis of contributions made throughout one's employment and a minimum retirement age, which has been recently modified to 62 for women and 65 for men. Privatised pension schemes, such as employer-sponsored and individual retirement savings plans, supplement the public pension system by providing tax incentives to promote participation. The reforms are designed to alleviate economic burdens on the government while encouraging extended working lives and

increased dependence on private savings. The Brazilian model is undergoing development to guarantee both sufficiency and durability by harmonising urgent social requirements with long-term economic well-being (Source: Social Security, Brazil). One can sum up these retirement planning models as follows:

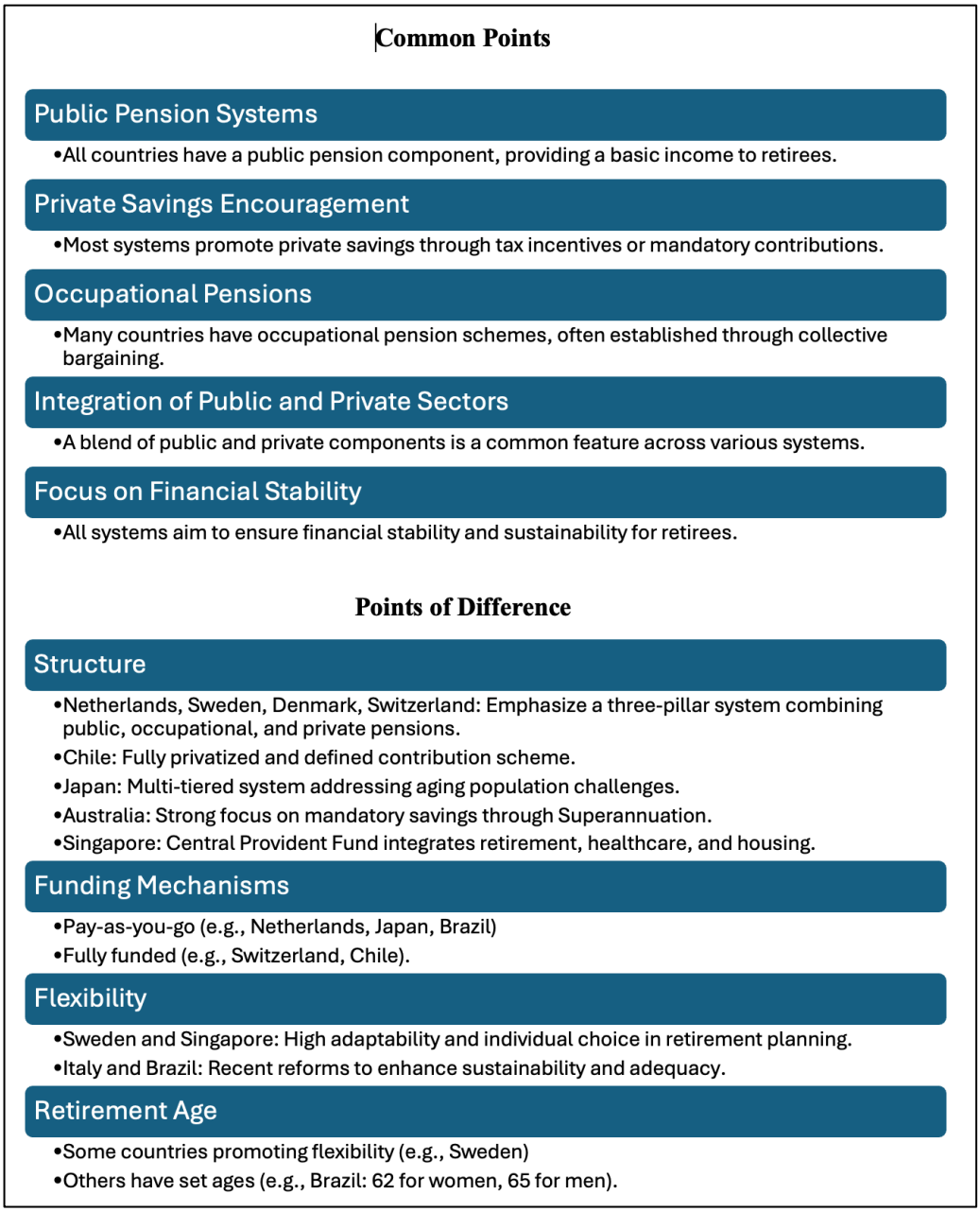

Fig. 1.1: Retirement Planning Models (POSs & PODs) (source: self)

1.4 Retirement Planning in India

The retirement planning framework in India comprises a combination of public and commercial plans specifically tailored to meet the requirements of a heterogeneous population. The Employee's Provident Fund (EPF) is a compulsory savings program

for employed individuals in the formal sector, financed by contributions from both employers and employees. The Public Provident Fund (PPF) is a voluntary savings plan designed for long-term savings, providing compelling interest rates and tax advantages. The National Pension System (NPS), implemented in 2004, is a universally accessible defined contribution scheme that offers individuals the freedom to choose from various investment options and benefit from tax regulations. Furthermore, the Indira Gandhi National Old Age Pension Scheme (IGNOAPS) is a government initiative that offers a fundamental old-age pension to with low income. The model used by India aims to broaden the scope and promote savings among various sectors of the population, with the goal of achieving a complete strategy to ensure retirement security (Source: National Portal of India).

1.4.1 Current Status of Retirement Planning in India

As per the study conducted by the National Sample Survey Office (NSSO), about 52.8% of elderly people are economically dependent on others for their livelihood. Gainful employment at the ages of 60–80 years is just 5.3% and 1.4% for males and females, respectively. This proportion is less than 2% over the age of 80. In India, elders are thus forced to live with children (32%) or in a joint family (46%). Thus, for financial independence post-retirement, financial planning should be done well in advance.

to understand the retirement planning preparedness of Indians. A survey indicates that only 42% of people are on track to achieve their target retirement income. About 43% of people are dependent on savings and investments made prior to retirement to supplement their earnings post-retirement. about their backup plan in case they needed more income post-retirement. About 25% say they will go back to work, 25% would start a business, and 21% would rent out a spare room.

It is a clear observation that a proportion of the Indian population is actively involved in retirement planning. Secondly, planners have multiple options to choose from but lack clarity as to which is most appropriate for them. Thus, an initiative is required to propose a public-level system that can set up a common benchmark for all wealth management and retirement planning models. Further, customised offerings based on individuals' particulars and preferences can be proposed to increase overall satisfaction from retired life.

Retirement satisfaction pertains to the degree of contentment and overall well-being that persons encounter throughout their retirement period. This metric indicates the degree to which an individual's retirement lifestyle corresponds to their anticipated desires and personal inclinations. The level of contentment experienced after retirement is a subjective construct that exhibits significant variability across individuals. (Elder *et al.,* 1999)

1.4.2 Shifting Demographics

The landscape of retirement planning in India is being reshaped by a confluence of shifting demographics and evolving economic realities. As the country navigates through profound transformations in its population structure and economic environment, understanding these changes becomes essential for effective retirement planning and policy formulation. This introductory section the intricate interplay between demographic shifts and economic trends, highlighting their implications for individuals, families, and policymakers alike.

India's demographic profile is undergoing significant changes, population and evolving family structures. According to the National Statistical Office (NSO), the proportion of elderly individuals aged 60 and above is steadily increasing, a trend that mirrors global patterns. By 2031, it is projected that the elderly will constitute approximately 12.5% of the total population. This shift is driven by declining fertility rates and increasing life expectancy, both of which are indicative of a demographic transition that is reshaping the age distribution of the Indian populace.

The reduction in fertility rates, a result of socio-economic changes and improved access to healthcare, has led to a smaller proportion of younger people relative to the older population. As a consequence, the a growing burden on the working-age population to support an expanding elderly demographic. This shift presents significant challenges for retirement planning, as it necessitates a reassessment of how resources are allocated and how social safety nets are designed.

Additionally, traditional family structures in India are evolving. The joint family system, which has historically provided a support system for elderly members, is giving way to nuclear families. Urbanisation and economic migration contribute to this shift, as younger generations move to cities for better job opportunities. This transformation

impacts the ability of families to provide informal care for elderly relatives, further emphasising the need for formal retirement and pension schemes.

1.4.3 Economic Realities and Their Implications

The economic landscape in India is experiencing parallel shifts that are influencing retirement planning. Economic growth, while robust in recent decades, has been uneven, with disparities between urban and rural areas and between different socio-economic groups. The rise of the informal sector, lack of formal benefits, presents challenges for traditional retirement planning. Many workers in the informal economy lack access to structured pension schemes and retirement savings plans, leaving them vulnerable in their later years.

In contrast, the formal sector has witnessed the growth of employer-sponsored pension schemes and retirement benefits. However, these benefits are often limited to certain segments of the workforce, leaving a significant portion of the population without adequate retirement security. The implementation of the Employees' Provident Fund (EPF) and the National Pension System (NPS) are steps in the right direction, but they also highlight the disparities in coverage and benefits across different sectors.

The economic pressures on individuals and families are further compounded by inflation and the rising cost of living. As prices for essential goods and services increase, maintaining a comfortable standard of living in retirement becomes more challenging. The impact of inflation on fixed retirement income can erode purchasing power, making it imperative for individuals to plan for contingencies and explore investment options that offer protection against inflation.

The financial landscape for retirees is also influenced by changing investment patterns. Traditionally, Indians have physical assets like gold and real estate as investment vehicles. However, the growing awareness of financial markets and investment products is gradually altering these preferences. Understanding these new investment opportunities and their risks is crucial for effective retirement planning, as individuals seek to balance growth with security.

1.4.4 Policy Responses and Future Directions

In response to these shifting demographics and economic realities, there is a growing recognition of the need for comprehensive policy interventions. Government initiatives, such as the Pradhan Mantri Jan Dhan Yojana (PMJDY) and the Atal Pension Yojana

(APY), aim to enhance financial inclusion and provide retirement security for a broader segment of the population. These programs are designed to address the gaps in coverage and offer support to individuals who may not have had access to traditional pension schemes.

Moreover, the ongoing reforms in the pension sector, including the expansion of the NPS and the introduction of hybrid pension plans, reflect a shift more inclusive and flexible retirement solutions. These reforms seek to accommodate the diverse needs of India's population and address the challenges posed by an ageing society and evolving economic conditions.

The importance of financial literacy and retirement planning education cannot be overstated. As individuals are increasingly responsible for their own retirement savings, understanding the principles of investment, savings, and risk management becomes critical. Financial education initiatives and awareness campaigns play a vital role in empowering individuals to make informed decisions and plan effectively for their retirement.

The interplay between shifting demographics and economic realities presents both challenges and opportunities for retirement planning in India. As the country continues to evolve, it is essential for policymakers, financial institutions, and individuals to adapt to these changes and develop strategies that ensure a secure and fulfilling retirement for all. The journey effective retirement planning in India requires a nuanced understanding of these dynamic factors and a commitment to addressing the diverse needs of the population.

1.4.5 Advances in Retirement Planning

In response to these evolving challenges, the field of retirement planning in India has seen several advancements. Financial institutions, insurance companies, and government bodies have developed new products and services to address the diverse needs of retirees.

1.4.5.1. Mutual Funds and Retirement Plans: Mutual funds and retirement plans in India have become pivotal components of financial planning, reflecting the country's evolving economic landscape and increasing awareness about the importance of securing a financially stable retirement. Mutual funds, which pool money from various investors to invest in a diversified portfolio of stocks, bonds, or other securities, have

gained popularity due to their ability to offer professional management and risk diversification. In the context of retirement planning, mutual funds offer several tailored products such as systematic investment plans (SIPs), equity-linked saving schemes (ELSS), and specific retirement-orientated funds that provide tax benefits and potential for long-term growth. SIPs, for instance, enable individuals to invest a fixed amount regularly, fostering disciplined savings habits while leveraging the power of compounding over time. ELSS funds, on the other hand, are particularly attractive due to their tax-saving benefits under Section 80C of the Income Tax Act, making them a dual-purpose tool for wealth accumulation and tax efficiency.

1.4.5.2. National Pension System (NPS): Launched in 2004, the NPS has become a significant component of retirement planning for many Indians. It offers a mix of equity, corporate bonds, and government securities, allowing investors to choose their asset allocation based on risk appetite and retirement goals. The NPS is highly flexible and portable, making it suitable for a workforce that is increasingly mobile and diverse. Additionally, contributions to NPS are eligible for tax deductions, further enhancing its appeal as a retirement savings vehicle.

1.4.5.3. Senior Citizens Savings Scheme (SCSS): The SCSS, introduced by the government, is specifically designed for retirees seeking a safe investment avenue with attractive interest rates. This scheme provides regular income and ensures capital protection, addressing the needs of retirees who prefer low-risk investments.

1.4.5.4. Health Insurance Plans: health insurance products for senior citizens. These plans offer coverage for a range of medical expenses, including conditions, ensuring that retirees are protected against high healthcare costs.

1.4.5.5. Reverse Mortgage Schemes: Reverse mortgage schemes allow retirees to convert their home equity into a steady stream of income while continuing to live in their property. This innovative solution provides financial support without requiring retirees to sell their homes, offering an additional layer of financial security.

1.4.5.6. Employees' Provident Fund (EPF): Employees' Provident Fund (EPF) remains a traditional yet crucial component of retirement planning for salaried individuals. It mandates contributions from both employees and employers, ensuring a steady accumulation of funds over the years. The EPF scheme also offers an interest

rate that is generally higher than typical savings accounts, providing a secure and relatively high-yield investment option for the long term.

1.4.6 Government Initiatives and Financial Institutions' Contributions

The Indian government and financial institutions have .

1.4.6.1. Financial Literacy Programs: To enhance awareness and understanding of retirement planning, the government and financial institutions have launched various financial literacy programs. These initiatives aim to educate individuals about the importance of early planning, investment options, and the benefits of different retirement products.

1.4.6.2. Tax Incentives and Benefits: The government offers tax incentives for contributions to retirement savings plans such as the NPS and EPF. These benefits encourage individuals to save more for retirement and enjoy tax relief on their investments.

1.4.6.3. Pension Reforms: Recent pension reforms have focused on expanding coverage and improving the sustainability of pension systems. Efforts include increasing the participation of the informal sector in retirement schemes and enhancing the benefits provided under existing pension plans.

Insurance companies in India have also developed a range of retirement-specific products, such as pension plans and annuities. These products are designed to provide a steady income stream post-retirement, addressing the need for financial stability in the absence of regular employment income. Pension plans often include features like guaranteed returns, death benefits, and flexible payout options, catering to the varied requirements of retirees.

1.4.6.4. Collaborations with Financial Institutions: Financial institutions play a crucial role in retirement planning by offering innovative products and services tailored to retirees' needs. Collaborations between banks, insurance companies, and government agencies have led to the development of comprehensive retirement solutions that address various aspects of financial security.

The mutual fund industry in India, managed by the Securities and Exchange Board of India (SEBI), has seen robust growth, with a notable increase in the assets under management (AUM). This growth can be attributed to increased financial literacy, rising disposable incomes, and a shift in investment preferences from traditional fixed

deposits to more market-linked instruments. The introduction of technology and digital platforms has also made mutual fund investments more accessible, transparent, and user-friendly, encouraging wider participation from younger demographics as well.

1.4.7 The Future of Retirement Planning in India

As India continues to evolve, so too will the landscape of retirement planning. The increasing focus on financial independence, coupled with advancements in technology and financial products, is expected to shape the future of retirement planning. Innovations such as digital financial planning tools, investment strategies will likely become integral to retirement planning.

The changing socio-economic environment will necessitate a greater emphasis on holistic retirement planning that encompasses not just financial security but also health, lifestyle, and personal fulfilment. As retirees navigate this new era, they will need to balance their financial goals with their aspirations for a meaningful and fulfilling retirement.

Retirement planning in India has . The evolving economic and demographic landscape, coupled with advancements in financial products and government initiatives, has created a more dynamic and complex retirement planning environment. Understanding these changes and leveraging available resources will be essential for individuals seeking to secure a comfortable and fulfilling retirement. As the field continues to evolve, ongoing innovation and adaptation will be key to addressing the diverse needs of retirees and ensuring their long-term financial well-being.

1.4.7.1 Technological and Financial Literacy

The advent of digital technology has the potential to planning in India. Fintech innovations, including mobile apps and online platforms, are making it easier for individuals to manage their retirement savings and access financial planning tools. These technological advancements offer greater transparency, convenience, and .

However, the digital divide remains a challenge. While urban and tech-savvy individuals benefit from these innovations, rural and less digitally literate populations may struggle to access and utilise these tools effectively. Bridging this digital divide is essential for ensuring that all segments of the population can take advantage of technological advancements in retirement planning.

Financial literacy is another critical component in shaping the future of retirement planning. Many individuals lack the knowledge and skills necessary to make informed financial decisions regarding their retirement. Increasing financial literacy through education and awareness programs is crucial for helping individuals understand the importance of saving for retirement and making informed investment decisions. can play a significant role in enhancing financial literacy across diverse demographics.

1.4.7.2 Societal and Cultural Shifts

retirement are also evolving. The traditional view of retirement as a period of rest and withdrawal from active life is being challenged by a growing emphasis on continued engagement and productivity. Many retirees are seeking opportunities to remain active, pursue new interests, and contribute to society in meaningful ways. This shift reflects a broader societal change rather than a mere cessation of work.

This evolving perspective on retirement has implications for retirement planning strategies. There is a growing need for retirement plans that support not only financial security but also opportunities for continued personal and professional engagement. Initiatives that promote lifelong learning, volunteerism, and part-time work options can enhance retirees' quality of life and sense of purpose.

1.4.7.3 Challenges and Opportunities

The future of retirement planning in India presents both challenges and opportunities. Globally, the following expectations are met and unmet by retirement planning options:

Expectations Met	Expectations Unmet

• Comprehensive Coverage
  • Most systems provide extensive coverage to retirees, ensuring a basic standard of living.
• Promotion of Savings
  • Tax incentives and mandatory contributions are widely implemented to encourage personal savings.
• Adaptation to Demographics
  • Many countries have made adjustments to address aging populations and ensure long-term viability.
	• Sufficiency of Income
	  • Some systems, like Chile, face criticism regarding the adequacy of retirement income.
	• Equity and Justice
	  • Italy's reforms aim for fairness, but challenges remain in achieving intergenerational equity.
	• Inclusiveness
	  • South Africa's system is designed to cater to diverse socio-economic backgrounds, but gaps still exist in coverage and benefits.

Fig. 1.2: Retirement Planning Models (Expectations) (source: self)

The increasing life expectancy and changing family structures require innovative solutions to ensure that retirees can maintain financial security and well-being. Addressing gaps in pension coverage, enhancing financial literacy, and leveraging technological advancements are crucial steps in shaping a more inclusive and effective retirement planning framework.

At the same time, there are opportunities to redefine retirement in a way that aligns with evolving societal expectations. By fostering a culture of lifelong learning and active engagement and developing policies and programs that support diverse retirement needs, India can create a more dynamic and fulfilling retirement experience for its ageing population.

In conclusion, the future of retirement planning in India is poised for transformation. As demographic, economic, and societal factors continue to evolve, there is a pressing need to adapt retirement planning strategies to meet the diverse needs of a growing and changing population. By addressing existing challenges and seizing emerging opportunities, India can pave the way for a retirement landscape that ensures financial security, personal fulfilment, and continued engagement for all its retirees.

1.5 Concept of Retirement Satisfaction

The notion of retirement satisfaction has undergone substantial development over time, mirroring shifts in cultural standards, economic circumstances, and personal aspirations. A restricted definition of retirement contentment was initially established, with a primary emphasis on financial security. Nevertheless, modern viewpoints have expanded this perspective by integrating a comprehensive strategy that encompasses financial security, physical well-being, social interaction, mental health, and intrinsic satisfaction.

Financial readiness is strongly interconnected with retirement satisfaction and continues to be a fundamental aspect of this idea. Adequate financial resources enable retirees to maintain their preferred quality of life, fulfil healthcare requirements, and participate in recreational pursuits without excessive strain. Empirical research has repeatedly demonstrated a direct relationship between financial stability and contentment in retirement. The capacity to finance a somewhat acceptable standard of living, obtain high-quality medical treatment, and prevent financial greatly improves the whole retirement experience.

The aspect of health is an additional crucial component of retirement contentment. Maintaining optimal physical and mental well-being enables retirees to fully and autonomously embrace their latter years. Severe chronic diseases or major health problems can greatly reduce quality of life, resulting in lower satisfaction. Hence, the availability of healthcare services, implementation of preventative measures, and adherence to a healthy lifestyle are crucial factors in attaining elevated levels of overall happiness throughout retirement. Moreover, mental health, so often disregarded, plays a key role. Optimal psychological well-being, encompassing elements such as an optimistic perspective on life, minimal levels of anxiety and sadness, and strong self-confidence, is crucial for a satisfying retirement.

Social interaction and interpersonal connections play a substantial role in determining retirement contentment. Many may experience a feeling of isolation and loss of purpose while transitioning from a structured job setting to retirement. The maintenance of robust social networks, active participation in community events, and cultivation of significant connections are crucial for psychological well-being. Social connections offer crucial emotional support, alleviate feelings of isolation, and contribute to a stronger sense of belonging, all of which are essential for a fulfilling retirement.

Increasingly acknowledged as crucial elements of retirement contentment are personal fulfilment and the opportunity to pursue individual interests and hobbies. The notion of self-actualisation, of actively pursuing individual objectives and interests. Participating in of meaning and achievement, whether through volunteer work, personal interests, travel, or continuous education, greatly amplifies overall life contentment. In this regard, it is crucial to see retirement not just as a time of relaxation but also as a chance for ongoing personal advancement and progress.

The significance of pre-retirement preparation cannot be exaggerated. Thorough retirement planning, which includes financial, health, and lifestyle factors, establishes the foundation for a smooth and secure transition into retirement. Individuals who engage in proactive planning and preparation for retirement by establishing attainable objectives and expectations generally get greater levels of happiness. The adoption of this proactive strategy serves to alleviate possible tensions and uncertainties normally connected with retirement.

Cultural and societal dimensions influence the formation of retirement satisfaction. Ageing-related cultural attitudes, social support networks, and government regulations have a substantial impact on the retirement experience. In cultures that highly value the process of ageing and have highly developed support systems, retirees frequently express greater levels of happiness. The provision of social security, healthcare benefits, and possibilities for lifelong learning by government programs significantly augments the quality of retirement.

Ultimately, retirement contentment is a complex notion that goes beyond just financial stability to include aspects such as physical well-being, social involvement, psychological satisfaction, and efficient preparation. Achieving optimal levels of pleasure in retirement necessitates a comprehensive strategy that encompasses these many facets, therefore guaranteeing that individuals can experience a gratifying and satisfying life after retirement. With the ongoing evolution of society norms and economic situations, the concept and pursuit of retirement satisfaction will also undergo changes to align with the evolving requirements and expectations of retirement consumers.

Theories around retirement satisfaction aim to explain the determinants and processes that influence an individual's contentment in retirement. : role theory, continuity theory, and the life course perspective.

1.5.1 Role Theory

Role theory posits that retirement satisfaction is significantly influenced by the transition from the worker role to the retiree role (Phillips, 1957). According to this theory, roles are central to an individual’s identity and social interactions. The shift from employment to retirement involves not only a loss of the worker role but also potential gains in new roles, such as those related to family, leisure, and community engagement. Role theory suggests that retirement satisfaction depends on how well individuals adapt to this role transition (Martinčeková & Škrobáková, 2019; Van Solinge, 2013). Successful role adaptation involves finding new roles that provide a sense of purpose and fulfilment, compensating for the loss of the worker role. Conversely, failure to adapt to new roles can lead to feelings of loss, disengagement, and dissatisfaction.

1.5.2 Continuity Theory

Continuity Theory offers a different perspective, before and after retirement (Lange & Grossman, 2010). This theory, proposed by Atchley (1989), suggests that individuals who engage in activities and maintain relationships similar to those they enjoyed before retirement are more likely to experience high levels of retirement satisfaction (Martinčeková & Škrobáková, 2019; Van Solinge, 2013). Continuity in lifestyle and routines provides a sense of stability and identity, reducing the stress associated with the transition to retirement. This theory highlights the adaptive strategies that individuals use to preserve their preferred ways of living and personal identity, suggesting that those who can maintain continuity in important life domains tend to report higher satisfaction in retirement.

1.5.3 Life Course Perspective

The life course perspective provides a comprehensive framework that considers the entire life span and the timing of life events (Martinčeková & Škrobáková, 2019; Van Solinge, 2013). This perspective emphasises that retirement satisfaction is influenced by an individual's cumulative life experiences, socio-economic status, and the timing of retirement. Key concepts within this perspective include "linked lives", "timing of events", and "human agency". The "linked lives" concept suggests that the satisfaction of retirees is interconnected with the experiences and well-being of significant others, such as spouses and family members. "Timing of events" refers to the significance of when retirement occurs within an individual's life course, with early or late retirement having different implications for satisfaction. "Human agency" underscores the role of personal choices and actions in shaping retirement outcomes. The life course perspective integrates the impact of historical, social, and cultural contexts on retirement experiences, offering a holistic view of the factors that contribute to retirement satisfaction (Gettings & Anderson, 2018).

In summary, the theoretical frameworks of role theory, continuity theory, and the life course perspective, along with financial and psychological theories, collectively provide a comprehensive understanding of the determinants of retirement satisfaction. These theories underscore the personal, social, and economic factors that influence how individuals adjust to and find satisfaction in retirement. Academic research continues

to explore these dimensions, aiming to develop interventions and policies that enhance retirement well-being across diverse populations.

1.6 Concept of Retirement Preparedness

Retirement preparedness is a multidimensional concept that encompasses to transition from their working lives into retirement, ensuring they can maintain their desired lifestyle and well-being. This preparedness involves not only financial stability but also psychological readiness, health management, and social adaptability. Theories around retirement preparedness the factors that contribute to a successful retirement transition and the processes by which individuals prepare for this significant life change.

1.6.1 Life Course Theory

One of the foundational theories in understanding retirement preparedness is the Life Course Theory (Martinčeková & Škrobáková, 2019; Van Solinge, 2013; Gettings & Anderson, 2018). This theory emphasises the importance of considering the entire life span when examining retirement preparations. It posits that retirement readiness is influenced by cumulative life experiences, including education, career trajectory, family dynamics, and social interactions.

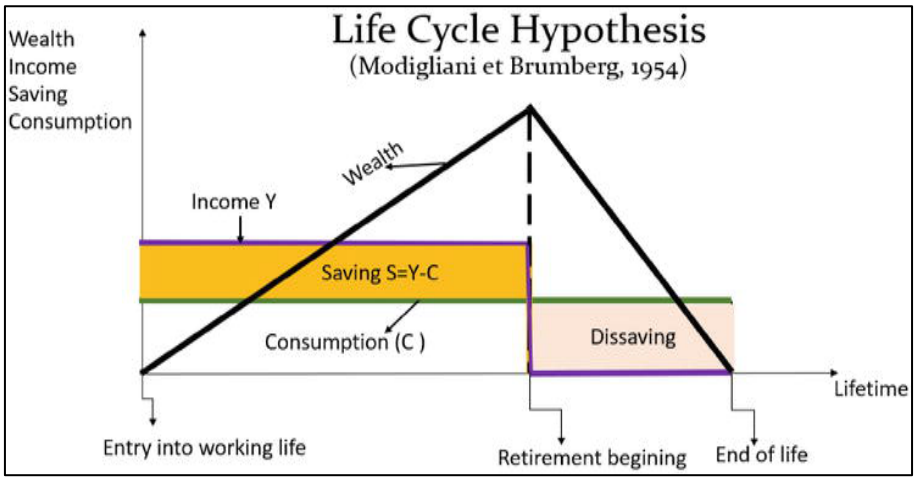

Figure 1.3: Consumption, consumer income, wealth, and saving over the life cycle. (Source: Modigliani and Brumberg, 1954)

According to this perspective, decisions made early in life, such as career choices and saving behaviours, significantly impact retirement preparedness. The life course perspective also highlights the role of significant life events, such as health crises or changes in family structure, which can alter retirement trajectories and necessitate adaptive strategies.

1.6.2 Resource-Based Dynamic Perspective

The resource-based dynamic perspective is another critical framework. This theory suggests that retirement preparedness is contingent on the accumulation and management of various resources over time (Noone *et al.,* 2022; Wang, 2012). These resources include financial assets, health status, social support, and psychological well-being. The dynamic aspect of this theory acknowledges that resources can fluctuate due to external factors, such as economic conditions or health changes, as well as internal factors, such as personal decisions and behaviours. Therefore, continuous resource management and adaptation are essential for maintaining preparedness as one approaches retirement.

1.6.3 Role Theory

The role theory the psychological and social dimensions of retirement preparedness. This theory examines how the transition from a work role to a retirement role impacts individuals' identities and social status (Phillips, 1957; Martinčeková & Škrobáková, 2019; Van Solinge, 2013). Work often provides not only financial resources but also a sense of purpose, identity, and social connections. Effective retirement preparedness, from this perspective, involves finding new roles and activities that fulfil these psychological and social needs. Engaging in volunteer work, hobbies, or part-time employment can help retirees maintain a sense of purpose and social engagement, thus enhancing their overall retirement experience.

1.6.4 Behavioural Economic Theory

Behavioural economic theory offers another lens through which to view retirement preparedness, focusing on the financial decision-making processes (Thaler & Benartzi, 2004; Gunaratne & Nov, 2015). This theory explores how cognitive biases and heuristics influence retirement saving . For example, individuals may exhibit present bias, prioritising immediate consumption over long-term savings, or they may be influenced by the default options in retirement plans, such as automatic enrolment and contribution rates. Understanding these behavioural tendencies allows policymakers and financial planners to design interventions, such as automatic escalation of contributions or providing clear and simplified information to enhance retirement savings and preparedness.

1.6.5 Self-Determination Theory

Self-determination theory adds a psychological dimension, emphasising the importance of autonomy, competence, and relatedness in retirement planning (Henning *et al.,* 2019). According to this theory, individuals are more likely to engage in proactive retirement planning if they feel autonomous in their decision-making, competent in managing their finances, and supported by their social network. This theory emphasises the necessity of education and empowerment in financial planning, as well as the importance of a supportive social environment that encourages and facilitates retirement preparedness activities (Stephan *et al., 2018).*

In summary, the concept of retirement preparedness is multifaceted, involving financial, psychological, health, and social dimensions. Theories such as life-course theory, resource-based dynamic perspective, role theory, behavioural economic theory, and self-determination theory provide comprehensive frameworks to understand the various factors influencing retirement readiness. These theories highlight the importance of a holistic approach to retirement influences. By integrating these perspectives, individuals and policymakers can better navigate the complexities of preparing for a successful and fulfilling retirement.

1.7 Concept of Retirement Preferences

The concept of retirement preferences encompasses individuals' desires and aspirations regarding the timing, nature, and conditions of their retirement. Retirement preference is a complex construct influenced by a multifaceted array of factors encompassing economic, psychological, social, and demographic dimensions. Economically, an individual's financial readiness plays a critical role; this includes the adequacy of retirement savings, expected pension benefits, and the availability of other income sources, such as part-time work or investments. Financial security provides the foundation upon which retirement decisions are made, often determining the timing and lifestyle choices in retirement. Psychologically, factors such as health status and perceived longevity significantly impact retirement preferences. Good health and a longer life expectancy may encourage prolonged workforce participation, while health concerns might necessitate early retirement.

Theories around retirement preferences aim to explain the factors that influence these choices and how they are formed over the life course. Three prominent theoretical

frameworks in this domain are the life course perspective, rational choice theory, and the socioemotional selectivity theory.

1.7.1 Life Course Perspective

A life-course perspective emphasises the importance of considering an individual's entire life span and the timing of life events when examining retirement preferences. This perspective posits that retirement decisions are not made in isolation but are influenced by a myriad of factors accumulated over a lifetime, including work history, family responsibilities, health status, and socio-economic context (Martinčeková & Škrobáková, 2019; Van Solinge, 2013; Gettings & Anderson, 2018). Individuals actively shape their retirement preferences based on their past experiences, current circumstances, and future expectations. This holistic view integrates personal, historical, and social dimensions, offering a comprehensive understanding of how retirement preferences are formed and evolve.

1.7.2 Rational Choice Theory

Rational *choice theory* posits that individuals make retirement decisions based on a rational evaluation of costs and benefits, aiming to maximise their overall utility and well-being. According to this theory (Feldstein, 1974), retirement preferences are influenced by factors such as financial readiness, health status, job satisfaction, and personal goals. Individuals weigh the financial implications of retiring at different ages, considering factors like pension benefits, savings, and potential income from part-time work. They also assess the non-financial aspects, such as the desire for leisure time, opportunities for travel, and engagement in hobbies or volunteer work. Rational Choice Theory suggests that individuals make retirement decisions based on a cost-benefit analysis, striving to optimise their life satisfaction and fulfilment in retirement (De Preter *et al., 2013*). This theory emphasises the value of economic and rational considerations in shaping retirement preferences.

1.7.3 Socioemotional Selectivity Theory

Socioemotional Selectivity Theory offers a psychological perspective, suggesting that as individuals age, their time horizons become more limited, leading them to prioritise emotionally meaningful goals and relationships (Cubrich & Petruzzelli, 2020; Löckenhoff, 2012). This theory, developed by Laura Carstensen, posits that older adults become more selective in their social interactions and activities, focusing on those that

provide emotional satisfaction and fulfilment. Consequently, retirement preferences are influenced by the desire to spend more time with loved ones, engage in enjoyable activities, and reduce stress associated with work. This theory highlights the shift in motivation from pursuing long-term goals to seeking immediate emotional gratification as individuals approach retirement age. Socioemotional selectivity theory emphasises the role of psychological and emotional factors in shaping retirement preferences, suggesting that quality of life and emotional well-being become central considerations in retirement planning.

1.7.4 Expectancy Theory

Expectancy theory in the field of organisational behaviour can be applied to understand retirement preferences (Jacobson & Eran, 1980; Vroom *et al.*, 2015). This theory posits that individuals make decisions based on their expectations of achieving desired outcomes. Applied to retirement, it suggests that individuals' preferences are influenced by their beliefs about the likelihood of achieving a satisfying retirement experience, which is shaped by factors such as perceived financial security, health prospects, and anticipated lifestyle changes.

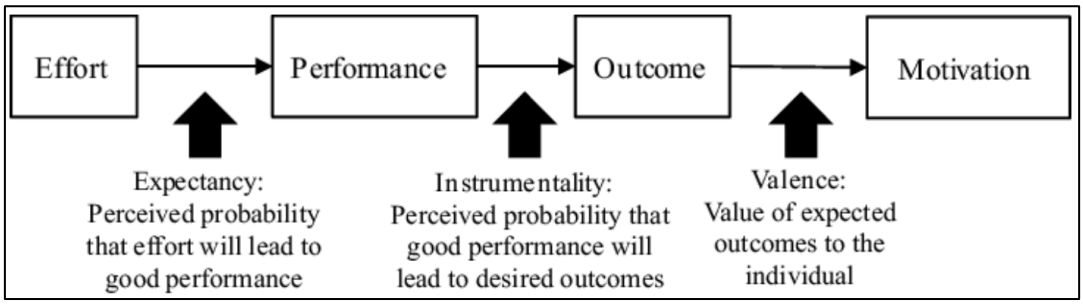

Fig. 1.4: Vroom's (1964) Expectancy Theory.

(adapted from **http://faculty.css.edu/dswenson/web/OB/VIEtheory.html)**

In summary, the life course perspective, rational choice theory, and socioemotional selectivity theory, along with expectancy theory, provide comprehensive frameworks for understanding retirement preferences. These theories collectively highlight the interplay of life history, economic rationality, and psychological motivations in shaping how individuals envision and plan for their retirement. Academic research continues to explore these dimensions, aiming to develop insights and interventions that align retirement planning with individuals' preferences and enhance their overall well-being in later life.

1.8 Evolution of Retirement Planning Models

The evolution of retirement planning models reflects a dynamic interplay between demographic shifts, economic theories, and the changing nature of work and ageing. Over the decades, researchers have proposed various models to better understand and facilitate retirement planning, each introducing unique concepts and methodologies to address the complexities of retirement.

1.8.1 Life Cycle Hypothesis (LCH)

In the early stages, the **Life Cycle Hypothesis (LCH)** (Modigliani & Brumberg, 1954) laid the groundwork for understanding retirement planning. This model posits that individuals plan their consumption and savings behaviours over their lifetimes with the aim of smoothing consumption (Martinčeková & Škrobáková, 2019; Van Solinge, 2013; Gettings & Anderson, 2018). According to the LCH, individuals save during their working years and dissave during retirement, anticipating a relatively stable consumption pattern throughout their lives. This model was pioneering in highlighting the importance of intertemporal choice in retirement planning.

1.8.2 Gary Becker's Human Capital Theory

In the 1960s, **Gary Becker's human capital theory** introduced a new dimension by emphasising the role of education and training in enhancing earning capacity and, consequently, retirement savings.

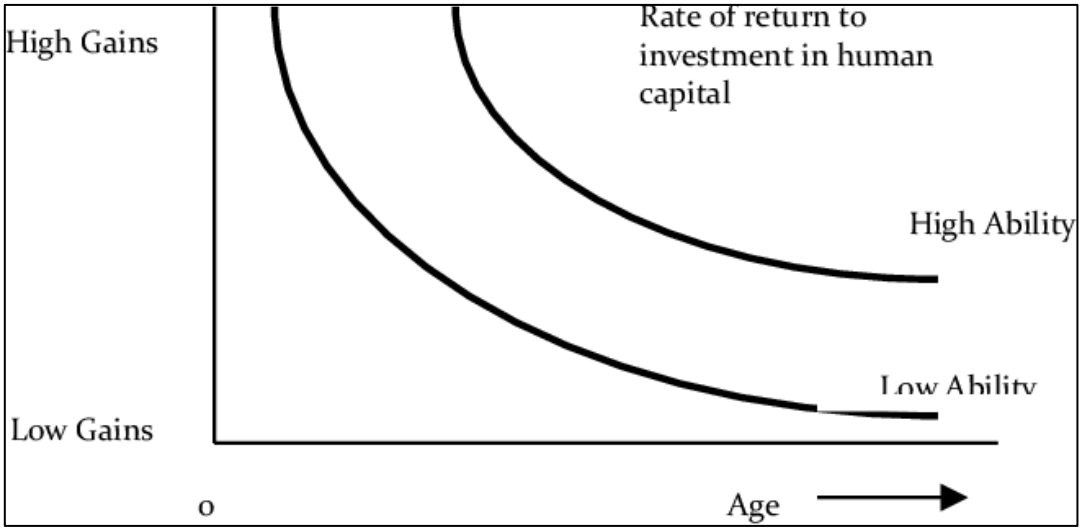

Fig 1.5: Higher benefits from early investments (Source: Krasniqi, 2016)

Becker's theory suggested that investments in education and skills increase lifetime earnings and impact retirement readiness by providing higher income streams and the

ability to save more (Becker, 1992). This approach integrated the concept of human capital investment into retirement planning, underscoring the long-term benefits of education.

1.8.3 Permanent Income Hypothesis (PIH)

The **Permanent Income Hypothesis (PIH),** developed by Milton Friedman in the 1960s, further refined the understanding of consumption and savings. Friedman proposed that (Friedman, 1957b; Christiano *et al.*, 1987) individuals base their consumption decisions on their expected long-term average income rather than their current income. This model suggests that people save and dissave to maintain a stable consumption level over time, aligning with the principles of the Life Cycle Hypothesis but emphasising the role of long-term income expectations in shaping savings behaviour.

1.8.4 Behavioural Economics

In the 1980s, **behavioural economics started to challenge traditional models by incorporating psychological insights in economic decision-making.** Researchers like Richard Thaler introduced concepts such as mental accounting, loss aversion, and the impact of heuristics and biases on financial decisions. Thaler's work highlighted that individuals often deviate from rational behaviour due to cognitive biases, which leads to suboptimal retirement planning. This perspective is unique in its approach to understanding the psychological barriers to effective retirement savings and the need for policy interventions to guide better financial behaviour (Benartzi & Thaler, 2013).

1.8.5 Markowitz's Modern Portfolio Theory (MPT)

Markowitz's Modern Portfolio Theory (MPT) significantly influenced retirement planning by introducing the concept of portfolio optimisation. Harry Markowitz's theory, which focusses on the trade-off between risk and return, helped retirees and financial planners design investment portfolios that maximise returns for a given level of risk (Wisista & Noveria, 2023; Ganguly & Prakash, 2023). This quantitative approach to asset allocation became a cornerstone of retirement investment strategies.

1.8.6 Stochastic Models

The **stochastic models** of the 1990s and 2000s, such as those proposed by James Poterba, David Wise, and others, introduced probabilistic approaches to retirement planning. These models acknowledged the uncertainties and risks associated with

retirement, including longevity risk, investment risk, and healthcare costs (Maritato *et al.,* 2022). By incorporating stochastic processes, these models allowed for a more realistic simulation of retirement outcomes, helping individuals and policymakers better prepare for the variability inherent in retirement planning.

1.8.7 The Social Security Wealth Model

In the late 1990s, **the Social Security Wealth Model** by Alan Gustman and Thomas Steinmeier offered ideas about how Social Security benefits influence retirement decisions. Their model incorporated the value of expected Social Security benefits into retirement planning, highlighting its role as a crucial component of retirement income for many individuals (Hou *et al.,* 2020).

1.8.8 The Health and Retirement Study (HRS)

The Health and Retirement Study (HRS), initiated in the early 1990s, offered a comprehensive dataset that has been pivotal for numerous retirement models. This longitudinal study, designed by F. Thomas Juster and Richard Suzman, has provided valuable data on health, economic, and social factors affecting retirement, enabling more detailed and accurate models of retirement behaviour (Phillips & Weir, 2023).

1.8.9 The Dynamic Programming Models

Recently, **the dynamic programming models** have emerged, leveraging advancements in computational power to solve complex retirement planning problems. Researchers like John Ameriks and Olivia Mitchell have utilised dynamic programming to optimise retirement strategies, considering multiple periods and various uncertainties (Van & Warin, 2020; Owadally *et al.,* 2021). These models are unique in their ability to provide personalised retirement plans by continuously updating and optimising decisions based on changing circumstances and new information.

1.8.10 Lifecycle Investing Models

Lifecycle investing models by Zvi Bodie and others emphasise the importance of adjusting asset allocation throughout an individual's life. These models advocate for more conservative investment strategies as one approaches retirement, balancing growth and risk management to ensure financial security (Janssen *et al.,* 2013; Hogan, 2007).

1.8.11 Machine Learning and Big Data Analytics

Additionally, **the latest frontier in retirement planning models is the integration of machine learning and big data analytics** (Nikolic, 2023; Senousy *et al.,* 2020). These technologies enable the analysis of vast amounts of data to uncover patterns and trends that can inform retirement planning. By predicting individual behaviours and preferences, machine learning models offer highly tailored retirement solutions that enhance the precision and effectiveness of retirement planning.

The evolution of retirement planning models reflects a journey from classical economic theories to sophisticated, data-driven approaches. Beginning with the basic Life Cycle Hypothesis and moving through various theories like Human Capital Theory and Behavioural Economics, each step has brought new ideas and methods to retirement planning. The integration of behavioural insights and computational advancements has progressively refined the understanding and practice of retirement planning, offering increasingly personal and realistic solutions to meet the diverse needs of retirees.

1.9 Machine Learning Concept

Machine learning (ML) is a subset of artificial intelligence (AI) that focuses on developing algorithms and statistical models enabling computers to perform tasks without explicit instructions, relying instead on patterns and inference. The core concept of ML revolves around the idea that systems can learn from data, identify patterns, and make decisions with minimal human intervention. This paradigm shift from traditional programming methods to data-driven approaches is underpinned by various theories and principles, including supervised learning, unsupervised learning, semi-supervised learning, reinforcement learning, and deep learning.

Supervised learning is one of the most common types of machine learning, where the model is trained on a labelled dataset, meaning each training example is paired with an output label. The objective is to learn a mapping from inputs to outputs that can generalise well to new, unseen data. Algorithms such as linear regression, logistic regression, support vector machines, and neural networks are typical examples of supervised learning models. These models are evaluated using metrics like accuracy, precision, recall, and F1 score to determine their performance (Li, 2023; Frank *et al.,* 2020).

Unsupervised learning, in contrast, involves training a dataset without labelled responses. The model tries to infer the natural structure present within a set of data points. Techniques like clustering (e.g., k-means, hierarchical clustering) and dimensionality reduction (e.g., principal component analysis, t-SNE) fall under this category. These methods are crucial for exploratory data analysis, finding hidden patterns, and compressing data without significant loss of information (Li, 2023; Frank *et al.,* 2020).

Semi-supervised learning combines aspects of both supervised and unsupervised learning. It leverages a small amount of labelled data along with a large amount of unlabelled data during training. This approach is particularly useful when labelling data is expensive or time-consuming. It *improves learning accuracy by using the unlabelled data to understand more about the patterns and distribution, which helps it perform better on new data (Li, 2023; Frank et al., 2020).*

Reinforcement learning (RL) is a type of machine learning where an agent interacts with an environment and makes decisions to maximise some notion of cumulative reward. Unlike supervised learning, RL does not require labelled input/output pairs but instead relies on feedback from the environment to guide learning. Markov decision processes (MDPs) form the mathematical framework for modelling decision-making in RL, with algorithms like Q-learning and deep reinforcement learning (combining neural networks and RL) as prominent examples (Li, 2023; Frank *et al.,* 2020).

Deep learning, a subset of machine learning, focuses on neural networks with many layers (deep neural networks). It has revolutionised fields such as image recognition, natural language processing, and gaming due to its ability to learn hierarchical representations of data. Techniques like convolutional neural networks (CNNs) and recurrent neural networks (RNNs) are specialised architectures within deep learning tailored for tasks involving spatial and temporal data, respectively (Li, 2023; Frank *et al.,* 2020).

Machine learning models offer several advantages over traditional statistical and rule-based models. Firstly, **scalability** is a major benefit. ML models can handle large and complex datasets with numerous features and high dimensionality, which are often infeasible for traditional models. This capability is crucial in the era of big data, where the volume, variety, and velocity of data generation are unprecedented.

ML models excel in **pattern recognition** and can automatically detect complicated shapes and relationships within data without explicit programming. Traditional models often require manual feature extraction and domain expertise to identify relevant patterns, whereas ML models can learn these features directly from the data, improving accuracy and reducing bias.

Adaptability is another strength of ML models. They can be retrained and updated with new data to continually improve performance. This capability contrasts with traditional models, which may need significant re-engineering to adapt to new information or changing environments.

ML models, especially deep learning models, have shown remarkable success in fields requiring high-dimensional data processing, such as image and speech recognition, where traditional models often struggle. The ability of deep learning models to learn from raw data and extract meaningful representations has led to significant breakthroughs, outperforming traditional approaches by substantial margins

Chapter - 2

REVIEW OF LITERATURE

Chapter Orientation

Chapter 2 provides an in-depth review of existing literature relevant to the development of a dynamic post-retirement fund management model. It lays the theoretical and empirical groundwork necessary to contextualize the study's objectives, validate its variables, and identify gaps that the current research seeks to address. Given the complexity of retirement planning—especially in a diverse and rapidly evolving economy like India—this chapter draws from multiple disciplines including finance, behavioral economics, gerontology, sociology, and decision science. The orientation of the literature review is both thematic and construct-driven, enabling a comprehensive synthesis of past work on retirement preparedness, preferences, expectations, and satisfaction.

Conceptual Foundation and Thematic Scope

The chapter begins by establishing a conceptual framework for understanding retirement as not merely a financial or chronological event but as a complex, multi-phase life transition influenced by individual behavior, institutional structures, and socio-economic contexts. Early literature focused heavily on income replacement and pension sufficiency, typically using deterministic or fixed-ratio models for post-retirement financial needs. However, contemporary thought recognizes retirement as a personalized experience—shaped by evolving expectations, changing preferences, and the ability to adapt to post-retirement challenges. Accordingly, the review emphasizes three central constructs: retirement preparedness, retirement preferences, and retirement expectations—each contributing in unique ways to overall retirement satisfaction.

Retirement Preparedness: Multi-dimensional Readiness

Retirement preparedness is examined not just in financial terms but as a multidimensional construct encompassing health, emotional stability, social connectivity, and legacy planning. The review covers financial preparedness theories such as the Life Cycle Hypothesis (Modigliani & Brumberg, 1954), which postulates rational savings behavior over time, and critiques them using behavioral economic theories that highlight procrastination, inertia, and bounded rationality (Thaler & Benartzi, 2004).

Empirical studies reviewed include findings on savings adequacy, retirement literacy, and the use of formal retirement instruments such as pensions and provident funds. However, the literature often isolates financial preparedness from psychological or social dimensions. To address this, the review integrates insights from the resource-based dynamic model of retirement adjustment (Wang et al., 2011) and self-determination theory (Deci & Ryan, 2000), which argue for a broader view of preparedness. Gaps identified include insufficient modeling of preparedness in holistic terms, particularly in the Indian context where informal support systems and health risks vary widely.

Retirement Preferences: Personalization in Planning

The second major construct, retirement preferences, refers to how individuals envision and prioritize their retirement lifestyle—such as travel, family involvement, health needs, and continued engagement in part-time work or learning. The review highlights the limitations of traditional models which assume homogeneity in retirement goals. In contrast, more recent studies advocate for preference-driven planning, using frameworks such as expectancy theory (Vroom, 1964), rational choice theory, and socioemotional selectivity theory (Carstensen, 1999).

The chapter synthesizes literature on post-retirement activity preferences, psychological well-being, and autonomy as predictors of satisfaction. Empirical work is also reviewed on the role of gender, education, income, and social context in shaping preferences. However, it is noted that in the Indian literature, preference-based planning is underexplored, with most models focused on asset allocation rather than personalized retirement goals. This gap supports the need for models that align financial strategies with behavioral and aspirational dimensions.

Retirement Expectations: Anticipated Outcomes and Planning Gaps

The third pillar, retirement expectations, is reviewed as a cognitive and motivational construct that captures how individuals project their post-retirement reality. Literature in this area connects expectations with intention formation, readiness to act, and satisfaction outcomes. The theory of planned behavior (Ajzen, 1991) and goal-setting theory (Locke & Latham, 2002) are central frameworks that help explain how expectations shape financial behavior and long-term planning commitment.

The review draws attention to mismatches between expectations and reality—termed the "expectation-preparedness gap"—which can lead to dissatisfaction despite adequate financial resources. Studies also show how socio-economic status, exposure to retirement information, and cultural conditioning influence expectations. However, limited empirical models integrate expectations as a dynamic variable that affects and is affected by preparedness and preferences, particularly in Indian policy and planning literature. This again reinforces the case for a model that simultaneously considers all three behavioral constructs.

Retirement Satisfaction: An Outcome of Multidimensional Interaction

The chapter moves on to examine retirement satisfaction as the ultimate dependent variable in most retirement studies. It is treated as a multidimensional outcome that encompasses financial stability, health status, life purpose, social integration, and emotional well-being. The literature spans both objective (e.g., income, health metrics) and subjective (e.g., perceived well-being) indicators.

Several global studies confirm that retirement satisfaction is not solely dependent on income but is mediated by preparedness and preference alignment. The continuity theory (Atchley, 1989) and life course perspective (Elder, 1994) are foundational to understanding how satisfaction in retirement is shaped by life-long behaviors, accumulated resources, and transitions. The review highlights a lack of integrated models in India that link all influencing variables—expectations, preparedness, and preferences—to satisfaction in a dynamic and adaptable manner.

Models of Retirement Planning: From Static to Dynamic

A dedicated section is included to review existing retirement planning models, including fixed withdrawal models, Monte Carlo simulations, stochastic decumulation models, and dynamic programming approaches. These models are evaluated for their assumptions, adaptability, and relevance to Indian retirees. Most conventional models assume stable income and expense profiles, making them inadequate for a population marked by uncertainty in health costs, employment status, and family structures.

The review concludes that existing models largely ignore the behavioral heterogeneity and contextual diversity seen in Indian retirees. Few studies employ machine learning or data-driven personalization techniques in retirement planning. This gap justifies the development of a dynamic, behavior-based model—as proposed in this thesis—that

adapts to user clusters, learns from feedback, and recommends retirement products tailored to real-life behavioral inputs.

Summary of Literature Gaps and Theoretical Contribution

In its final section, the chapter presents a tabulated summary of gaps, mapping what current literature has addressed and what remains underexplored. Specific gaps include lack of personalization in retirement models; underrepresentation of behavioral variables in Indian studies; minimal integration of ML or AI-based adaptive planning tools; and scarcity of cluster-based approaches to differentiate retiree profiles.

The chapter thus not only reviews existing knowledge but builds a strong theoretical case for developing an integrative, dynamic, and ML-supported fund management model. It provides the foundation upon which the research objectives, hypotheses, and methodology are structured in subsequent chapters.

Chapter - 2

REVIEW OF LITERATURE

Preparedness, preferences, and expectations are three different terms in the context of retirement planning (Browning, 2018). Retirement expectations are a set scenarios that an individual visualises post-retirement life. This is a perfect picture of what an individual would like to see themselves in in retirement life (Akben-Selcuk & Aydin, 2021). This picture is designed from the experiences and exposures received during pre-retirement years. These expectations are set based on discussions done with peers, subject-matter experts and experiences shared by unknown individuals on media and other social platforms (Bissonnette & Van, 2010). These expectations may or may not differ from actual experience in the later years of life (Anderson *et al., 1986*).

As a retirement planner, an individual may think of uncertainties and prepare themselves to overcome them (Moffatt & Heaven, 2017). In a later part of life, these uncertainties may not even arise, or on the contrary, the implications of these uncertainties may be even more severe than planned.

"Retirement preparedness measure" is the capacity of an individual to overcome uncertainties (Keele & Alpert, 2015). "Measure of preparedness" can also be explained as the extent to which these uncertainties can be addressed by planned measures (Taylor & Doverspike, 2003). Retirement preparedness can be categorized into four broad types viz.,

- Financial preparedness
- Health preparedness
- Emotional and social preparedness, and
- Family and legacy preparedness

Post-retirement expectations may be considered as an expected outcome of the lifestyle preferences (Gee, 1999).

2.1 RETIREMENT PREPAREDNESS

Retirement preparedness means preparedness of an individual to address challenges arising post-retirement (Jutting & Lieberman, 2012). These challenges may be related to financial issues, healthcare issues or societal issues (Taylor & Doverspike, 2003).

Thus, retirement preparedness can be measured as the level of financial readiness, healthcare readiness and social readiness.

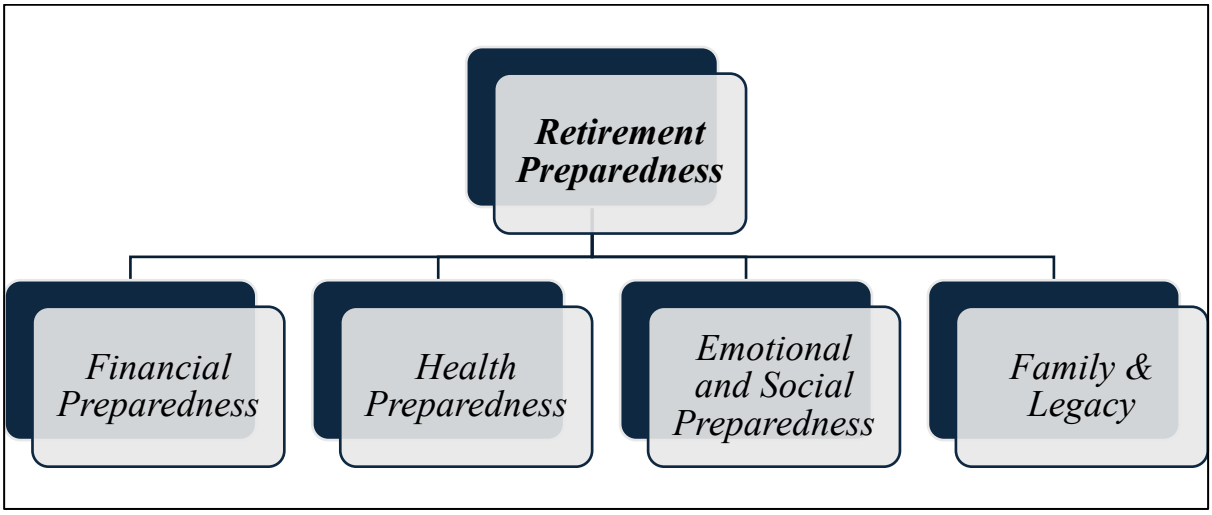

Fig. 2.1 : Retirement Preparedness Construct

2.1.1 Financial Preparedness

The investigation into financial readiness started in the early 1970s, with researchers from the United States and the United Kingdom demonstrating a keen interest in this field of study. Subsequent to then, other facets have been examined, leading to the current global recognition and interest in this area of research (Nawi et al., 2023).

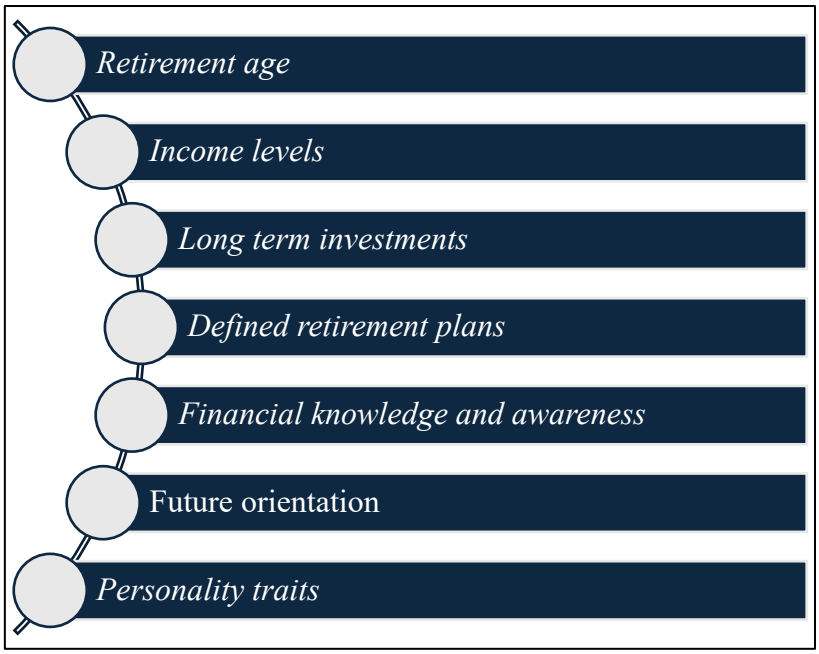

Fig. 2.2: Factors affecting Financial Preparedness

Financial preparedness refers to the state of being financially ready to meet both expected and unexpected expenses or financial needs (Coutaz, 2018). It involves having a solid financial foundation that enables individuals to handle life's various stages and challenges, such as emergencies, retirement, education, or significant purchases, without experiencing financial strain (Segel-Karpas & Werner, 2014; Coutaz, 2018). Factors affecting financial readiness are explained below:

2.1.1.1 Retirement age

According to the findings of Cole and Liebenberg (2008), there is a positive correlation between postponing household retirement age and improved financial readiness. The selection of a retirement age might have various implications on an individual's retirement income (Jensen *et al.*, 2024). In general, delaying retirement provides individuals with an extended period to accumulate funds for their retirement, potentially resulting in increased savings (Vettese, 2024). Moreover, deferring retirement may render individuals eligible for augmented Social Security benefits and pension disbursements (Slavov, 2024). This phenomenon has the potential to result in a higher level of income during one's retirement years, hence facilitating the ability to sustain the preferred style of living.

The act of postponing retirement provides individuals with the opportunity to persist in saving and investing, potentially augmenting their retirement fund (Zhang & Cao, 2024). This aspect has special significance in cases where individuals have not accumulated sufficient funds for retirement upon reaching their intended retirement age.

On the contrary, early retirement can result in a decrease in the overall required savings amount (Etgeton et al., 2023). This phenomenon can be attributed to the fact that individuals may have a reduced number of years in retirement, resulting in a decreased financial requirement to sustain their desired standard of living. Longevity risk pertains to the consideration of life expectancy while determining the appropriate retirement age (Krawczyk, 2024; Michaud & Amour, 2023). In the event of an individual opting for early retirement and subsequently experiencing an extended lifespan, there exists the potential risk of outlasting their financial resources (De Nardi et al., 2016). On the contrary, in the event of delaying retirement, one may have a potential limitation in fully experiencing the joys and benefits of their retirement period.

The quantity of pension payments someone receives may be influenced by the time of their retirement, particularly if they own a pension from their job (Muir & Turner, 2003). Certain pension plans provide increased benefits to individuals who choose to extend their working tenure.

2.1.1.2 Income levels

The pre-retirement income refers to the amount of money earned by an individual before their retirement. The correlation between pre-retirement income and the ability to save and invest for retirement is often positive, as those with higher incomes generally possess a greater capacity to allocate funds towards savings and investments (Tamborini & Kim, 2020). Individuals have the opportunity to enhance their retirement savings by making more contributions to retirement accounts (Scott *et al.*, 2020). This has the potential to result in the accumulation of a bigger financial reserve, so facilitating a more financially secure and comfortable retirement. According to the findings of Cole and Liebenberg (2008), there exists a positive relationship between pre-retirement income and post-retirement returns, which follows a non-linear pattern. This aligns with the findings presented by Engen et al. (2004).

The income replacement ratio is a significant factor in determining the necessary income for retirement, as it is based on the individual's pre-retirement income (Mantilla-Garcia *et al.*, 2024). It is generally recommended that individuals strive for an income replacement ratio of approximately 70-80% of their pre-retirement income in order to sustain their current way of living (Blanchett, 2023). In the event of a substantial pre-retirement income, the preservation of such an income level during retirement may necessitate substantial savings.

A greater pre-retirement income may potentially confer an advantageous position for individuals to approach retirement with reduced levels of debt, so facilitating the management of financial matters during retirement (Lusardi *et al.*, 2020).

2.1.1.3 Long term investments

Financial security in retirement can be enhanced by investing in long-term plans (Angrisani & Casanova, 2021), as it reduces the risk of depleting one's savings and experiencing a shortfall in funds during the post-employment years. Long-term investment plays a crucial role in financial preparedness for retirement by enabling individuals to accumulate wealth gradually, benefit from compound interest, and

weather market fluctuations over time (Parker *et al.,* 2022). It helps build a substantial retirement corpus, ensuring a steady income stream during retirement years. However, it requires disciplined contributions and a well-diversified portfolio to mitigate risks (Jeon & Park, 2020). While the potential for growth is significant, the unpredictability of markets and inflation can impact returns, underscoring the importance of ongoing financial planning and adjustments to meet retirement goals. Individuals with larger pre-retirement incomes may possess a greater ability to allocate funds towards assets that possess the potential to safeguard against inflation (Owadally *et al.*, 2021). These assets may include real estate, stocks, or inflation-protected securities, all of which play a crucial role in preserving purchasing power throughout retirement.

2.1.1.4 Defined retirement plans

According to the findings of Cole and Liebenberg (2008), individuals who own clearly defined contribution plans and have strategically designed investment portfolios demonstrate a higher likelihood of being well prepared for retirement. According to the findings of Hershey and Mowen (2000), there was no significant relationship seen between the level of "financial planning involvement" and the degree of "financial preparedness".

Defined Benefit (DB) Plans are retirement plans that guarantee a predetermined benefit to participants, which is decided by many parameters such as the number of years of service and the final salary. Retirement annuities offer a consistent and anticipated flow of income during one's retirement years. The benefit is commonly determined by computing a proportion of an individual's ultimate average wage. The presence of a defined benefit (DB) plan can offer individuals a dependable and comparatively safe stream of income during their retirement years, thereby contributing to the attainment of financial stability (Principi *et al.,* 2020).

Defined Benefit plans entail the employer or pension fund assuming the primary responsibility for investment management and assuring the availability of sufficient funds for retirement purposes. Employees often don't have to worry about investing decisions (Munnell *et al.,* 2022). This can prove advantageous, particularly for individuals lacking prior experience in investment.

Defined payment plans provide a heightened level of retirement income stability as they ensure a predetermined payment, frequently increased to account for inflation. In the

event of underperformance in investments, it is the responsibility of the employer or pension fund to guarantee the fulfilment of the promised benefit (Principi *et al.,* 2020). Defined Benefit plans are commonly associated with a particular company, and the continuity of benefits is frequently contingent upon maintaining employment with this employer. Certain plans offer the option of portability through rollovers; however, it is important to note that the extent of this mobility may be restricted (Velikova, 2021; Poterba, 2007). Defined Benefit plans typically necessitate employees to fulfil a specified duration of service (known as vesting) before they attain eligibility for the complete benefit. The retirement age and vesting criteria exhibit variability.

Defined Contribution (DC) plans rely on the combined contributions made by individuals and their employers, as well as the subsequent investment returns generated from these contributions (Poterba, 2007). The amount of income derived throughout retirement from a defined contribution (DC) plan is contingent upon the balance of the account and the performance of investments. The variability and predictability of a defined benefit plan are often greater than those of a defined contribution plan.

Defined Contribution plans provide individuals greater autonomy in determining their investment choices and contribution amounts. The amount of retirement savings an individual accumulates is contingent upon the combined contributions made by both the individual and their employer, as well as the subsequent performance of these contributions within the market (Brown & Weisbenner, 2009). These plans offer increased flexibility to participants, albeit with the caveat that individuals must assume a proactive role in the management of their retirement assets.

Defined Contribution programs subject individuals to market risk (Bhattacharya & Illanes, 2022). The account's value is subject to variability due to fluctuations in investment returns. Although they possess the potential to yield greater returns, they also include the vulnerability to market downturns, which can have an adverse effect on one's retirement funds.

Defined Contribution plans possess a higher degree of portability. Individuals have the option to transfer their account balance while transitioning between employment or consolidate numerous accounts into a single account. The flexibility can confer advantages to those who undergo frequent changes in their workplace. DC plans do not

have vesting requirements, and employees have flexibility over when they can access their retirement assets, subject to tax penalties if withdrawn too early.

2.1.1.5 Financial knowledge and awareness

According to the findings of Hershey and Mowen (2000), there exists a positive correlation between individuals' perceived financial awareness and their level of financial preparation.

Individuals who possess a strong understanding of financial matters are more inclined to partake in retirement planning activities, such as establishing objectives, formulating a budget, and calculating the necessary savings required for retirement (Angrisani & Casanova, 2021). Individuals possess a comprehension of the significance associated with initiating and maintaining a consistent pattern of early saves, hence resulting in the accumulation of more substantial funds for retirement purposes.

Having a strong understanding of financial concepts and principles empowers retirees to make well-informed decisions regarding their investment portfolio (Mndzebele & Kwenda, 2020). Individuals have the ability to achieve diversification in their investment portfolios, effectively managing the trade-off between risk and return. Furthermore, they may make informed decisions by selecting investment vehicles that are suitable for their specific objectives and risk appetite (Capponi & Weber, 2024). Individuals are less prone to engaging in impulsive or emotionally driven investing decisions that have the potential to adversely affect their retirement resources (Ricca & Scozzari, 2024).

The concept of tax efficiency refers to the ability of individuals or entities to minimize their tax liability while still complying with relevant tax laws. Individuals who possess a strong understanding of financial matters are knowledgeable of tax-advantaged retirement accounts and possess the necessary skills to effectively utilize them in order to minimize their tax obligations throughout their retirement years (Paiella & Tiseno, 2014). The individuals possess a comprehensive understanding of the tax ramifications associated with withdrawals, as well as the advantages inherent in employing tax-efficient withdrawal strategies.

Retirees who possess a strong understanding of financial matters are less susceptible to becoming targets of fraudulent activities and scams (Collins & Urban, 2016).

Individuals have the ability to detect possible warning signs and safeguard their retirement funds against deceptive schemes.

The possession of financial knowledge empowers retirees to make well-informed decisions regarding long-term care insurance and other strategic measures aimed at safeguarding their assets in the event of extended care needs during retirement (Hauff *et al., 2020)*.

The cultivation of financial awareness among retirees facilitates the development and adherence to a budget during their retirement years, so enhancing their ability to effectively oversee their expenditures and prolong the longevity of their savings. Informed individuals possess the capacity to strategize their estate in a more efficient manner, thereby guaranteeing the desired allocation of their assets and minimizing the imposition of excessive taxes or legal complexities upon their heirs.

Retirees who possess a strong understanding of financial matters are more capable of adjusting and effectively managing unanticipated financial obstacles during their retirement years, including economic recessions or unforeseen medical crises. A thorough understanding of financial fundamentals can lead to better financial confidence and lower stress in retirement, as individuals feel more in control of their financial situation.

2.1.1.6 Future orientation

Future orientation refers to an individual's tendency to focus on and plan for future events and outcomes. It involves a forward-looking perspective that prioritises long-term goals and aspirations. According to the findings of Hershey and Mowen (2000), a robust "future orientation" was found to have a notable impact on "financial preparedness".

Individuals with a future-oriented mindset prefer to initiate the process of retirement planning at an early stage in their professional trajectories (Tomar *et al.*, 2021). Individuals possess a comprehension of the significance associated with the act of saving and investing with a long-term perspective, hence potentially resulting in augmented retirement funds.

Individuals who possess a future-oriented mindset are more inclined to establish well-defined and attainable financial objectives for their retirement. Individuals possess a clear conceptualization of their desired post-employment lifestyle and subsequently

strategize their financial resources in alignment with this goal (Sharif & Naghavi, 2020).

The practice of regular saving and investing is a fundamental financial strategy employed by individuals to accumulate wealth through time. Individuals who possess a future orientation exhibit a greater propensity to engage in continuous saving and investment behaviours with the aim of securing financial stability throughout their retirement years (Nanda & Banerjee, 2021). Individuals place a high importance on allocating funds towards retirement accounts and possess a comprehensive understanding of the long-term benefits associated with compounding (Siegel, 2021).

Risk mitigation refers to the process of implementing strategies and measures to reduce or eliminate potential risks and their negative impacts (Mashrur *et al.,* 2020). Individuals who possess a future-oriented mindset frequently engage in proactive measures to minimise financial hazards during their retirement years. Individuals have the option to acquire insurance, establish emergency funds, and diversify their investments as strategies to safeguard themselves against unforeseen financial difficulties (Lingyan *et al.,* 2021).

Individuals who possess a future-oriented mindset are more inclined to have a long-term outlook while making investing decisions. Individuals are less influenced by immediate market volatility and instead prioritise their long-term retirement objectives (Lingyan *et al.,* 2021). Individuals who possess a future-oriented mindset are more equipped to effectively navigate and respond to the various changes and challenges that may happen throughout their retirement period (Safari, *et al., 2021)*. It is probable that they possess contingency plans for diverse possibilities, including alterations in health or economic circumstances.

Having a future perspective is frequently associated with increased levels of financial literacy and awareness. Individuals who engage in future-oriented planning exhibit a greater propensity to actively pursue information, enhance their financial literacy, and make well-informed judgements (Safari *et al.,* 2021).

Retirees who possess a future-oriented mindset are more inclined to possess a well-defined conception of their preferred retirement lifestyle, encompassing activities such as travel, hobbies, and other personal endeavours. Individuals strategically organise and allocate resources in order to sustain such a lifestyle.

Through the process of strategic financial planning and diligent savings, individuals who possess a forward-thinking mindset can effectively mitigate the burden of financial hardship throughout their post-retirement phase. Individuals are less prone to have concerns over financial insufficiency or encountering economic hardships.

Individuals that possess a future-oriented mindset frequently take into account the welfare of their family and engage in strategic planning for the preservation and continuation of their heritage. Individuals have the ability to establish wills and trusts, in addition to engaging in estate planning, in order to guarantee the desired distribution of their assets.

A prospective outlook might engender proactive healthcare strategizing during retirement, encompassing the acquisition of long-term care insurance, the establishment of health savings accounts, and engaging in conversations on possible healthcare expenditures.

2.1.1.7 Personality traits

The retirement preparation of an individual can be influenced by a variety of variables. Certain characteristics exhibit a low prevalence yet exert a significant influence on an individual's conduct (Hill & Pfund, 2022). The aforementioned characteristics are sometimes referred to as Cardinal qualities. Certain characteristics can influence an individual's behaviour, while they do not possess a deterministic nature. These characteristics are sometimes referred to as central attributes.

The influence of personality factors on individuals' financial preparation following retirement is significant. Individuals with varying personality types exhibit varied approaches to financial planning and decision-making, so impacting their degree of preparedness for retirement (Hurd *et al.,* 2012). The present analysis delineates several significant ramifications of personality factors on retirement planning and financial preparation.

The effect of conscientiousness is often observed in persons who exhibit characteristics such as being well organised, paying attention to detail, and demonstrating discipline. Individuals often exhibit a proactive approach when it comes to their financial planning and savings (Hill & Pfund, 2022). Conscientious individuals demonstrate a higher propensity to establish and maintain a retirement savings strategy, establish financial objectives, and consistently evaluate their advancement towards these goals. Due to

their rigorous approach, individuals frequently exhibit a high level of preparedness for retirement.

The concept of risk aversion refers to an individual's tendency to prefer certainty over uncertainty when making decisions involving potential gains or losses (Crawford & O'Dea, 2020). Risk-averse individuals exhibit a propensity to experience discomfort in the face of uncertainty, leading them to exercise caution in their investing and financial decision-making processes. Retirees who are cautious about taking risks may opt for a more conservative investment portfolio, so ensuring stability but potentially leading to diminished profits. The aforementioned strategy has the potential to impact the accumulation of funds allocated for retirement.

The concept of optimism refers to a cognitive and emotional state characterised by a positive outlook and expectation. Individuals with an optimistic disposition tend to possess a favourable perspective on forthcoming events and may exhibit a tendency to underestimate potential financial hazards (Akben-Selcuk & Aydin, 2021; Crawford & O'Dea, 2020). Retirees who possess an excessively optimistic outlook may fail to sufficiently plan for unforeseen financial obligations or fluctuations in the market. There is a possibility that individuals may possess inadequate contingency preparations, perhaps resulting in financial strain during their retirement years.

The concept of openness to new ideas refers to an individual's willingness and ability to embrace novel concepts, perspectives, and information. It encompasses a cognitive and affective receptiveness towards unfamiliar or unconventional thoughts. Individuals exhibiting a pronounced inclination towards openness tend to display a heightened receptiveness towards novel financial concepts and investing tactics (Hershey & Mowen, 2000). Open-minded individuals have a greater propensity to investigate novel investing alternatives, which in turn may result in the creation of diverse portfolios and potentially enhanced returns. Nevertheless, individuals should practise prudence in order to reduce the possibility of assuming an undue amount of risks.

Impulsivity is a psychological trait characterised by a tendency to act on immediate urges or desires (Hershey & Mowen, 2000). Individuals with impulsive tendencies may engage in impromptu financial decision-making without conducting comprehensive deliberation. The impact of impulsivity is evident in the realm of personal finance, as it can result in suboptimal decision-making characterised by excessive spending or

impulsive investments. These decisions have the potential to have a detrimental impact on one's retirement funds and preparedness.

Individuals exhibiting elevated levels of self-discipline frequently demonstrate adeptness in managing their urges and adhering to a predetermined financial strategy (Segel-Karpas & Werner, 2014). Retirees who exhibit self-discipline are more inclined to engage in consistent saving practises, refrain from wasteful expenditures, and adhere to a budget, hence potentially enhancing their level of financial readiness during retirement.

It has been shown that individuals who possess extroverted traits tend to exhibit a greater inclination towards engaging in social interactions and deriving enjoyment from investing their financial resources in social activities and experiences (Hastings & Mitchell, 2011). The impact of strong extraversion on retirees necessitates a cautious approach to budgeting for social activities in order to prevent excessive spending. The lack of effective spending management has the potential to significantly impact an individual's level of preparedness for retirement.

While financial literacy is not inherently a personality trait, it holds significant importance in terms of one's financial preparation (Hastings & Mitchell, 2011; Hastings *et al.,* 2013). Individuals possessing a greater level of financial literacy are more adept at making well-informed decisions pertaining to their finances. The impact of financial literacy is seen in the ability of individuals to make informed investment decisions, recognize the significance of saving, and develop comprehensive retirement plans, ultimately resulting in enhanced financial readiness.

2.1.2 Health Preparedness

Health related preparedness of any individual for retirement involves physical, mental and financial readiness. This readiness ensures that individual can overcome physical stress due to infections and illness. Mental wellbeing is must for happier post-retirement life. Financial readiness enables individual to take preventive or curative medicare.

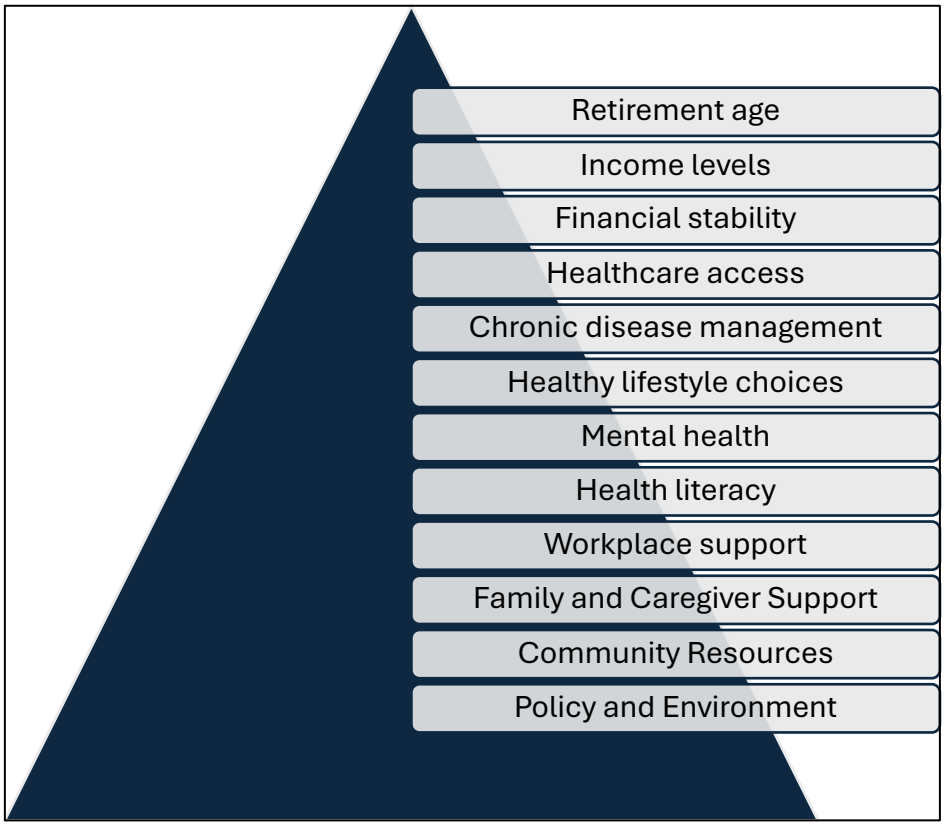

Fig. 2.3: Factors affecting Health Preparedness

Factors which affect health preparedness is as followed:

2.1.2.1 Retirement age

If an individual opts for retirement prior to meeting the eligibility criteria for Medicare, it may be necessary to procure private health insurance, a potentially costly endeavour (Phillips & Weir, 2023). Postponing retirement until one becomes eligible for Medicare can potentially alleviate this financial load.

2.1.2.2 Income Levels

Individuals with higher incomes may possess greater financial resources to manage healthcare expenditures during their retirement years, encompassing charges related to private health insurance and long-term care (McDonald & Donahue, 2000).

2.1.2.3 Financial stability

Having enough money saved and invested is crucial. It helps cover medical expenses, both expected and unexpected, during retirement (French & Jones, 2011). This financial cushion reduces stress and allows individual to enjoy retirement without constant worry. Pensions and Social Security are the consistent income sources which provide a

safety net, making it easier to afford healthcare and to maintain lifestyle without financial stress.

2.1.2.4 Healthcare access

Good health insurance ensures that an individual can get the required medical care, from regular check-ups to emergency treatments, without breaking the bank (De Nardi *et al.,* 2016). Knowing how to use Medicare and Medicaid can make a big difference. They offer affordable healthcare options that cover many services retirees need.

2.1.2.5 Chronic disease management

Managing chronic illnesses like diabetes or high blood pressure is key. Regular doctor visits, medication, and healthy habits can prevent complications. Getting regular screenings and vaccinations can catch health issues early, making them easier to treat and keeping individual healthier in the long run (Miah & Wilcox-Gök, 2007).

2.1.2.6 Healthy lifestyle choices

Eating a balanced diet with plenty of fruits, vegetables, whole grains, and lean proteins helps individual to stay energized and healthy, reducing the risk of diet-related diseases. Staying active with regular exercise like walking, swimming, or yoga keeps heart strong, muscles flexible, and entire body independent (Ding *et al.,* 2016). Steering clear of smoking, excessive drinking, and other harmful habits lowers the risk of serious health problems like cancer and liver disease.

2.1.2.7 Mental health

Access to therapy and counselling helps manage stress, depression, and anxiety, ensuring enjoyable retirement with a positive mindset. Staying connected with family, friends, and community activities helps combat loneliness and keeps mind sharp and spirits high (Butterworth *et al.,* 2006).

2.1.2.8 Health literacy

Knowing how to understand and use health information empowers individual to make smart decisions about care, leading to better health outcomes (Mustafa *et al.,* 2023). Embracing digital health tools like telemedicine, health apps, and wearable devices makes it easier to monitor health and get medical advice whenever it is required.

2.1.2.9 Workplace support

Participating in wellness programs at work can boost fitness, reduce stress, and foster healthy habits that benefit after retirement. Using resources provided by employer to

plan for retirement can ease the transition, reducing uncertainty and feeling prepared (Browne *et al.,* 2019).

2.1.2.10 Family and Caregiver Support

Having family support is invaluable. They can help with healthcare decisions, provide emotional support, and assist with daily activities, making retirement life smoother and more enjoyable (Wang & Shi, 2014). When needed, professional caregivers ensure that individual get the necessary help, especially if health conditions require regular attention.

2.1.2.11 Community Resources

Community health programs offer a range of services, from health screenings to fitness classes and educational workshops. These programs help individual to stay active, informed, and connected, which is essential for overall well-being (Jenkins *et al.,*2002). Senior centers provide a place to socialize, learn, and stay active. Participating in activities at a senior center can improve mental and physical health by keeping senior citizens engaged and involved.

2.1.2.12 Policy and Environment

Supportive policies, such as funding for senior healthcare programs and protections against age discrimination, create an environment where anyone can access the resources as per the need. These policies help ensure that everyone gets the care and support necessary for a healthy retirement (Van Holle *et al.,* 2014). Living in a safe, accessible neighborhood with parks, walking paths, and healthcare facilities encourages physical activity and makes it easier to get medical care. A supportive environment promotes overall health and well-being.

2.1.3 Emotional and social preparedness

Emotional preparedness for retirement involves the mental and emotional adjustments individuals need to make as they transition from a structured work life to a more unstructured retirement phase. This shift can evoke a range of emotions, including relief, excitement, anxiety, and uncertainty. Being emotionally prepared can significantly influence the overall retirement experience.

Social preparedness for retirement encompasses the readiness to maintain and build social connections outside of the workplace. Social interactions play a crucial role in maintaining mental and emotional well-being during retirement.

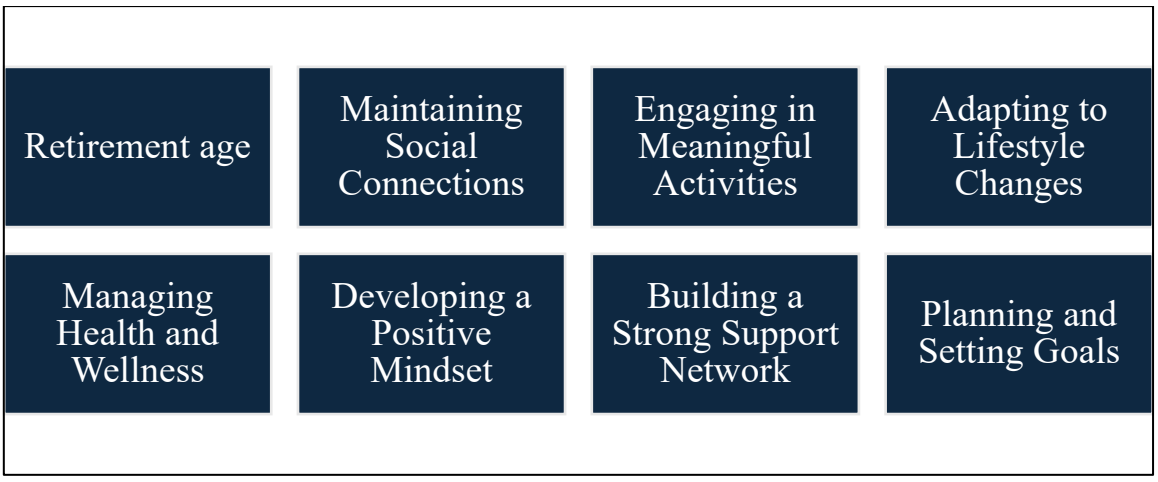

Fig 2.4: Factors affecting emotional and social preparedness

Factors affecting emotional and social preparedness are as followed:

2.1.3.1 Retirement age

There exists a subset of individuals who possess a preference for early retirement, driven by the desire to maximize their enjoyment of the post-work phase during a period of optimal physical well-being and heightened energy levels, so enabling the pursuit of personal interests and hobbies (Etgeton *et al.,*2023). Some individuals may opt to extend their working hours for the purpose of personal satisfaction or to maintain cognitive and social involvement.

2.1.3.2 Maintaining Social Connections

Maintaining social connections is crucial for emotional and social preparedness for retirement. As individuals transition out of the workforce, they often lose regular contact with colleagues, which can lead to feelings of isolation and loneliness. Staying connected with family, friends, and community members helps mitigate these feelings (Forster & Morris, 2012). Engaging in social activities, such as joining clubs, participating in group hobbies, or attending social gatherings, provides opportunities to meet new people and foster meaningful relationships. These interactions are vital for emotional well-being as they provide support, companionship, and a sense of belonging (Woods *et al.,* 2022). Additionally, social connections can offer practical support in daily life, such as assistance with errands or companionship during medical appointments. Maintaining these relationships requires effort and intention, but the rewards in terms of emotional stability and social fulfillment are significant. Research has shown that strong social ties are linked to better mental health, lower rates of

depression, and even increased longevity. Thus, cultivating and maintaining social connections is a foundational element of preparing emotionally and socially for retirement.

2.1.3.3 Engaging in Meaningful Activities

Engaging in meaningful activities plays a significant role in emotional and social preparedness for retirement. Many individuals derive a sense of purpose and identity from their work, and retirement can create a void that needs to be filled (Scherger *et al.,* 2011). Finding activities that provide a sense of purpose can help bridge this gap. Volunteering, for instance, allows retirees to contribute to their community, stay active, and meet new people. Hobbies and interests that were perhaps sidelined during working years can now take center stage, offering joy and fulfilment (Genoe *et al.,* 2022). Whether it's gardening, painting, traveling, or playing a musical instrument, these activities not only keep the mind engaged but also provide a sense of accomplishment and satisfaction. Participation in group activities or clubs related to these interests also fosters social interactions and builds new friendships. Engaging in such activities can help retirees maintain a positive outlook, reduce stress, and improve overall well-being (Asebedo & Seay, 2014). It provides structure to their days and ensures they continue to feel valuable and productive in their post-work years.

2.1.3.4 Adapting to Lifestyle Changes

Adapting to lifestyle changes is a critical aspect of emotional and social preparedness for retirement. Retirement often brings significant changes in daily routines, financial situations, and living arrangements, which can be challenging to navigate. Individuals must adjust to the newfound freedom of not having a structured work schedule (Motegi, *et al.,* 2016). This adjustment can be both liberating and overwhelming. Planning a flexible but fulfilling daily routine can help ease this transition. Financial adjustments may also be necessary as retirees shift from a regular paycheck to fixed incomes from pensions or savings (Vivel-Búa *et al.,* 2019). Budgeting and financial planning are essential to ensure that they can maintain their desired lifestyle without financial stress. Moreover, some may choose to downsize their living arrangements or relocate, which involves emotional and social adjustments. Embracing these changes positively and finding ways to adapt can lead to a smoother transition (Woods *et al.,* 2022). Engaging

in new activities, seeking new social circles, and being open to new experiences can help retirees create a fulfilling and balanced retired life.

2.1.3.5 Managing Health and Wellness

Managing health and wellness is paramount for emotional and social preparedness for retirement. Physical health significantly impacts mental and emotional well-being (Vo & Phu-Duyen, 2023). As individuals age, they may face health challenges that require attention and adaptation. Regular exercise, a balanced diet, and routine medical check-ups are essential components of maintaining good health. Staying active not only benefits physical health but also provides opportunities for social interaction, such as joining fitness groups or walking clubs. Mental health is equally important; engaging in activities that stimulate the mind, like puzzles, reading, or learning new skills, can help maintain cognitive function (Anderson & Mellor, 2008). Stress management techniques, such as mindfulness, meditation, or yoga, can also support emotional well-being. Additionally, having a strong support system, including healthcare providers, family, and friends, ensures that retirees have the necessary resources and assistance when health issues arise (Banhato *et al.,* 2015). Taking proactive steps to manage health and wellness contributes to a higher quality of life and enhances the ability to enjoy social interactions and activities during retirement.

2.1.3.6 Developing a Positive Mindset

Developing a positive mindset is essential for emotional and social preparedness for retirement. This period of life can bring uncertainties and challenges, but approaching it with a positive attitude can make a significant difference (Butterworth *et al.,* 2006). Embracing retirement as an opportunity for growth, new experiences, and personal development can lead to a more fulfilling and enjoyable phase of life. Setting realistic and achievable goals helps retirees maintain a sense of purpose and direction. Practicing gratitude and focusing on the positive aspects of life can improve overall happiness and reduce feelings of anxiety or depression. It is also important to acknowledge and accept the emotions that come with such a major life transition, whether they are positive or negative (Vo & Phu-Duyen, 2023). Seeking support from mental health professionals, if needed, can provide tools and strategies to maintain a positive outlook. Engaging in social activities and surrounding oneself with positive, supportive people also

contributes to a healthier, more optimistic mindset. Ultimately, a positive mindset fosters resilience, adaptability, and a greater sense of satisfaction in retirement.

2.1.3.7 Building a Strong Support Network

Building a strong support network is vital for emotional and social preparedness for retirement. A support network comprises family, friends, and community resources that provide emotional, practical, and sometimes financial support (Gustman & Steinmeier, 2002). Having a reliable support system helps retirees navigate the challenges of retirement and provides a sense of security and belonging. Family members can offer emotional support, assist with daily activities, and help manage health care needs. Friends provide companionship, share common interests, and participate in social activities, which are crucial for maintaining mental and emotional well-being. Additionally, engaging with community groups, religious organizations, or social clubs can expand one's support network and create new connections (Woods, *et al.,* 2022). It is also beneficial to be aware of local resources, such as senior centers, volunteer organizations, and health services, which can provide various forms of support and engagement opportunities. A strong support network ensures that retirees do not feel isolated and have access to the assistance they need, contributing to a more fulfilling and emotionally stable retirement.

2.1.3.8 Planning and Setting Goals

Planning and setting goals are fundamental aspects of emotional and social preparedness for retirement. Many people find fulfillment and a sense of purpose through their careers, and retirement can create a void that needs to be filled with new goals and plans (Schwaba & Bleidorn, 2019). Setting both short-term and long-term goals provides direction and motivation. These goals can be related to personal development, such as learning a new skill or pursuing a hobby, or they can focus on social aspects, like building new relationships or contributing to the community through volunteering. Having a plan for daily routines and activities also helps retirees structure their time and prevent feelings of aimlessness or boredom. Additionally, financial planning is crucial to ensure that retirees can comfortably support their desired lifestyle and activities (Janssen *et al.,* 2013). By clearly defining goals and creating actionable plans, retirees can approach this new phase of life with confidence and enthusiasm.

Planning and goal-setting not only provide a roadmap for retirement but also contribute to a sense of achievement and fulfilment.

2.1.4 Family and Legacy Preparedness

Family and legacy-related factors play a vital role in retirement preparedness. The involvement and support of family members, the assistance of professional caregivers, thoughtful estate planning, and strong intergenerational ties all contribute to a well-rounded and fulfilling retirement experience.

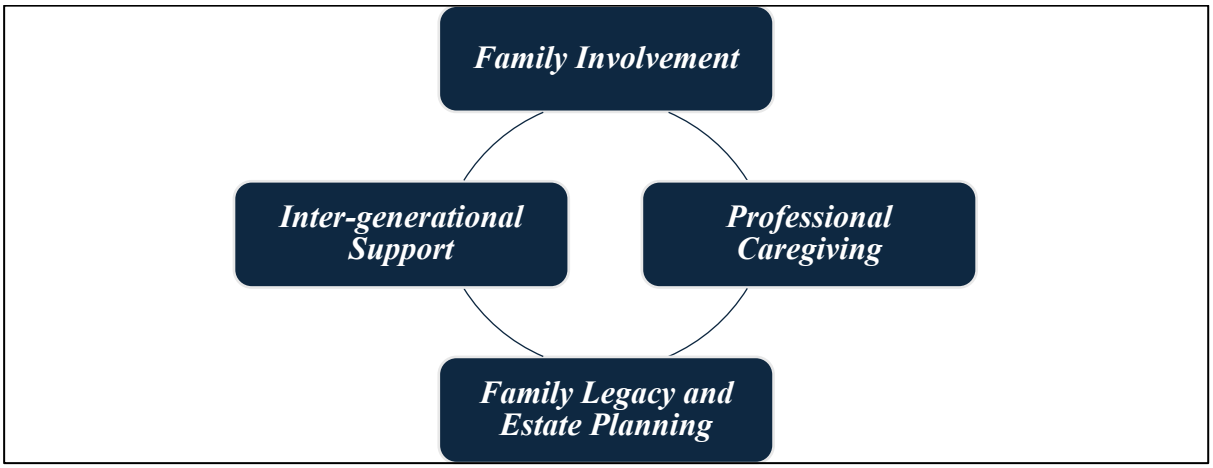

Fig. 2.5: Factors affecting Family and Legacy Preparedness

By addressing these factors, retirees can ensure that they are prepared for the challenges and opportunities that come with this new stage of life.

2.1.4.1 Family Involvement

Family involvement plays a significant role in retirement preparedness. As individuals approach retirement, the support and engagement of family members can profoundly impact their well-being and readiness for this new life stage (Sharif & Naghavi, 2020). Emotional support from family members is crucial; it provides retirees with a sense of belonging and security, helping to mitigate feelings of loneliness and isolation. Regular interactions with children, grandchildren, and other relatives can boost mental health, keeping retirees mentally active and socially connected.

Additionally, family members often play a key role in healthcare decisions. As retirees face health challenges, having family members who are informed and involved in their care can lead to better health outcomes (Vankova, 2022). Family members can assist with managing medical appointments, medication schedules, and even providing

physical care when needed. This kind of support is especially important for retirees dealing with chronic illnesses or mobility issues.

Moreover, family involvement can also extend to financial support (Gustman & Steinmeier, 2002). Adult children or other relatives may offer financial assistance or help manage financial affairs, ensuring that retirees can maintain a stable and comfortable lifestyle. Planning family meetings to discuss retirement goals, healthcare preferences, and financial plans can ensure that everyone is on the same page, reducing stress and fostering a collaborative approach to retirement preparedness.

2.1.4.2. Professional Caregiving

For many retirees, professional caregivers become an essential part of their support network. As individuals age, they may experience physical or cognitive decline that makes daily tasks more challenging. Professional caregivers can provide the necessary assistance, allowing retirees to maintain their independence and quality of life (Dentinger & Clarkberg, 2002). These caregivers can help with a range of activities, from personal care and household chores to transportation and medical appointments.

The presence of professional caregivers also brings peace of mind to both retirees and their families. Knowing that a trained professional is available to assist with daily needs and emergencies can alleviate worries about safety and well-being (Richardson, 2014). This is particularly important for retirees who live alone or have limited family support nearby.

Moreover, professional caregivers can offer specialized care for retirees with specific health conditions, such as dementia or mobility impairments. They are trained to handle the unique challenges associated with these conditions, providing both physical care and emotional support. By fostering a sense of companionship and security, professional caregivers help retirees maintain a positive outlook and enhance their overall quality of life.

Engaging professional caregivers also allows family members to focus on their own lives while ensuring their loved ones receive the best possible care (Sharif & Naghavi, 2020). This arrangement can prevent caregiver burnout among family members, promoting a healthier dynamic where everyone's needs are met.

2.1.4.3. Family Legacy and Estate Planning

Retirement is a time when many individuals start to think seriously about their legacy and how they want to be remembered by their loved ones. Estate planning becomes a critical component of this process, ensuring that retirees can pass on their assets and values to the next generation in accordance with their wishes (Fasang, 2008). This includes creating wills, trusts, and other legal documents that outline how their estate should be managed and distributed after their death.

Having a well-thought-out estate plan provides retirees with peace of mind, knowing that their loved ones will be taken care of and that their assets will be distributed according to their wishes (Sørensen, 2013). It also helps prevent potential conflicts among family members, as clear instructions can mitigate misunderstandings and disputes over inheritance.

Estate planning is not just about financial assets; it also involves making decisions about healthcare and personal wishes. Retirees may designate healthcare proxies or create advance directives to ensure that their healthcare preferences are respected if they become unable to make decisions for themselves. These preparations are crucial for maintaining dignity and autonomy in the later stages of life.

Additionally, discussing estate plans with family members can foster open communication and understanding, allowing everyone to be aware of the retiree's wishes and plans (Bell & Rauf Jr, 1998). This transparency can strengthen family bonds and ensure that everyone is prepared for the future.

2.1.4.4. Intergenerational Support

Intergenerational support is a two-way street that greatly influences retirement preparedness. Retirees often provide emotional and sometimes financial support to their children and grandchildren, fostering strong family ties and contributing to the well-being of younger generations (Damman & van Duijn, 2017). This support can take many forms, from helping with childcare to offering financial assistance for education or other significant life events.

On the other hand, retirees also benefit from the support of younger family members. Adult children and grandchildren can assist with daily tasks, technology, and healthcare management. This support helps retirees stay connected, engaged, and up-to-date with the rapidly changing world, enhancing their overall quality of life.

Intergenerational living arrangements are becoming more common, where multiple generations share a household (Eibich & Siedler, 2020). This arrangement can provide practical benefits, such as shared expenses and mutual caregiving. For retirees, living with younger family members can reduce feelings of isolation and provide a built-in support network.

Furthermore, intergenerational support fosters the exchange of knowledge and values. Retirees can share their life experiences, wisdom, and traditions with younger family members, enriching the family's cultural and emotional heritage (Ayalon, 2016). This exchange strengthens family bonds and ensures that the retiree's legacy continues to influence and inspire future generations.

2.2 RETIREMENT PREFERENCES

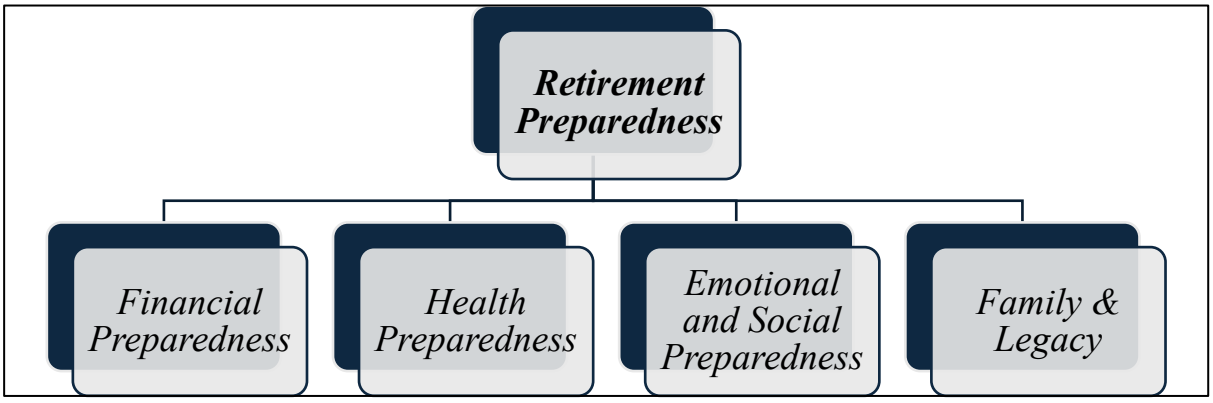

Fig 2.6: Retirement Preferences Construct

2.2.1 Lifestyle preferences

Lifestyle preferences refer to the choices individuals make regarding how they wish to live, encompassing aspects such as leisure activities, social interactions, housing, health, and daily routines. These preferences significantly shape one's retirement satisfaction, as retirement represents a major life transition where individuals have more control over their time and lifestyle choices than during their working years (Celidoni & Rebba, 2017). Academic research indicates that the alignment between pre-retirement expectations and post-retirement realities plays a crucial role in determining retirement satisfaction. Individuals who can maintain or achieve their desired lifestyle in retirement tend to report higher levels of contentment and well-being. For instance, retirees who prioritize social engagement and can maintain robust social networks often

experience greater life satisfaction and reduced feelings of loneliness and isolation. Similarly, those who value active lifestyles and have access to recreational activities and facilities tend to enjoy better physical and mental health, which positively influences their overall satisfaction (Kunstler, 2002). Financial security also intersects with lifestyle preferences, as the ability to afford desired activities and maintain a preferred standard of living is a key determinant of retirement satisfaction. Conversely, a mismatch between expected and actual lifestyle in retirement can lead to dissatisfaction. This misalignment can arise from inadequate financial planning, health issues, or unforeseen life events that constrain one's ability to live as desired. Therefore, understanding and planning for one's lifestyle preferences is essential in retirement planning, enabling individuals to set realistic goals and make informed decisions about savings, investments, and other preparations. In summary, lifestyle preferences are a fundamental aspect of retirement satisfaction, as they encapsulate the personal choices that contribute to an individual's sense of fulfilment and happiness in their later years.

Fig. 2.7: Factors affecting lifestyle preferences

Factors affecting lifestyle preferences are:

2.2.1.1 Financial Resources

Financial resources significantly influence lifestyle preferences in retirement. For many, the extent of their savings, investments, and pension plans dictates the quality

and variety of experiences they can afford (Lusardi *et al.,* 2020). A well-funded retirement allows for travel, dining out, and pursuing hobbies, while a limited budget may require more frugality and a focus on cost-effective activities. Financial planners often emphasize the importance of early and consistent savings, as well as smart investments, to ensure retirees can maintain their desired lifestyle (Vivel-Búa *et al.,* 2019). Access to financial advisors and resources plays a crucial role in this planning process. Additionally, understanding social security benefits and other governmental support programs can help retirees maximize their financial potential. Without sufficient financial planning, retirees may find themselves constrained in their choices, potentially impacting their overall satisfaction and quality of life (Amorim & França, 2020). Therefore, the correlation between financial resources and lifestyle preferences in retirement underscores the necessity of financial literacy and proactive planning to secure a fulfilling retirement.

2.2.1.2 Health and Physical Fitness

Health and physical fitness are pivotal in shaping lifestyle preferences during retirement. A retiree's health status often determines their ability to engage in various activities. Those in good health can pursue more active hobbies such as hiking, biking, or traveling, while those with health issues might prefer quieter, less physically demanding pursuits (Anderson and Mellor, 2008). Regular exercise, a balanced diet, and routine medical check-ups are essential for maintaining good health. Access to healthcare and fitness facilities also plays a significant role in enabling retirees to stay active and healthy. Mental health is equally important, as it affects one's ability to enjoy retirement fully (Butterworth *et al.,* 2006). Engaging in activities that stimulate the mind, such as reading, puzzles, or learning new skills, can help maintain cognitive function. Overall, prioritizing health and physical fitness can lead to a more dynamic and satisfying retirement, allowing individuals to fully enjoy the fruits of their labor.

2.2.1.3 Social Connections

Social connections profoundly impact lifestyle preferences in retirement. The quality and extent of a retiree’s social network can determine their emotional well-being and overall happiness. Those with strong family ties, friendships, and community involvement tend to have a more active and fulfilling retirement (Duflo & Saez, 2003). Social interactions provide emotional support, reduce feelings of loneliness, and

enhance mental health. Retirees often engage in group activities such as clubs, volunteer work, or social gatherings to maintain these connections. Furthermore, living in a community that offers social opportunities, such as senior centers or active retirement communities, can enrich one's social life. For many, the ability to spend time with loved ones, whether it's children, grandchildren, or lifelong friends, is a significant aspect of their desired retirement lifestyle (Fasang, 2008). Therefore, nurturing social connections and staying engaged with the community is essential for a rewarding retirement experience.

2.2.1.4 Personal Interests and Hobbies

Personal interests and hobbies play a crucial role in defining lifestyle preferences during retirement. Retirement provides an opportunity for individuals to delve into activities they are passionate about, whether they are long-held interests or new pursuits (Schellenberg *et al.,* 2005). For some, this might mean dedicating time to creative endeavors such as painting, writing, or playing music. Others might find joy in physical activities like gardening, golfing, or hiking. Intellectual hobbies, such as reading, learning new languages, or taking courses, keep the mind sharp and provide a sense of accomplishment (Stebbins, 2000). Additionally, volunteering or participating in community projects allows retirees to give back and stay connected with society. The freedom to explore personal interests not only fills time but also brings a sense of purpose and fulfillment. As such, encouraging the development and pursuit of hobbies can greatly enhance the quality of life in retirement.

2.2.1.5 Geographic Location

Geographic location is a significant factor in determining lifestyle preferences for retirement. The choice of where to live can affect a retiree's activities, social interactions, and overall satisfaction (Ayalon & Yahav, 2019). Some retirees prefer to stay close to family and friends, while others may choose to relocate to a more desirable climate or a community that caters specifically to seniors. Coastal areas, warm climates, and cities with rich cultural offerings are popular choices. Additionally, access to healthcare facilities, recreational activities, and amenities like shopping and dining can influence this decision (Duncombe *et al.*, 2003). For many, the cost of living in a particular location is also a crucial consideration, as it impacts financial stability and the ability to enjoy various lifestyle options. The decision of where to live in retirement

is deeply personal and can shape the overall experience, highlighting the importance of choosing a location that aligns with one's lifestyle preferences and needs.

2.2.1.6 Cultural and Community Engagement

Cultural and community engagement are essential in shaping lifestyle preferences during retirement. Participation in cultural activities, such as attending concerts, theater performances, and art exhibitions, enriches retirees' lives and provides intellectual stimulation (Cottier, 2018). Being part of a vibrant community that values arts and culture can significantly enhance one's retirement experience. Additionally, engaging in community activities, such as volunteering, joining clubs, or participating in local events, fosters a sense of belonging and purpose (Lam *et. al,* 2018). For many retirees, giving back to the community through volunteer work or mentorship programs is a fulfilling way to stay active and connected. Community engagement not only provides social interaction but also contributes to mental and emotional well-being. The availability of cultural and community opportunities can thus greatly influence lifestyle choices and the overall quality of life in retirement.

2.2.1.7 Technology and Accessibility

Technology and accessibility play a vital role in shaping lifestyle preferences for retirees (Ferreira & dos, 2013). The ability to use technology can significantly enhance one's quality of life by providing access to information, entertainment, and communication with loved ones. For instance, video calls allow retirees to stay connected with family and friends, regardless of distance. Online platforms offer opportunities for learning new skills, engaging in hobbies, and participating in virtual social groups. Additionally, smart home technologies can improve safety and convenience, enabling retirees to live independently for longer (Xie *et al.,* 2012). Accessibility features, such as user-friendly interfaces and assistive devices, ensure that technology is inclusive and beneficial for all. Furthermore, the internet provides access to telehealth services, allowing retirees to manage their health more effectively. Embracing technology and ensuring accessibility can thus greatly enhance lifestyle preferences, promoting a more connected, informed, and independent retirement experience.

2.2.1.8 Environmental and Climate Preferences

Environmental and climate preferences significantly impact lifestyle choices in retirement. The desire for a particular climate, whether it's a warm, sunny environment or a cooler, mountainous region, can influence where retirees choose to live and how they spend their time. Those who prefer warm weather might enjoy outdoor activities such as golfing, swimming, or gardening year-round. Conversely, individuals who favor cooler climates might relish hiking, skiing, or simply enjoying the changing seasons. The environment also plays a role in health and well-being; for instance, living in an area with clean air and low pollution can improve overall health and quality of life (Lu, 2020). Additionally, the availability of natural beauty and outdoor recreational opportunities can enhance daily living and provide a sense of peace and relaxation. Ultimately, aligning environmental and climate preferences with lifestyle desires can lead to a more enjoyable and fulfilling retirement.

2.2.2 Knowledge and skill enhancement preferences

Retirees can have diverse preferences for knowledge and skill enhancement, ultimately supporting their pursuit of a meaningful and enriched retirement.

Fig. 2.8: Factors affecting knowledge and skill enhancement preferences

Following factors affect these preferences:

2.2.2.1 Personal Interests and Hobbies

Personal interests and hobbies play a significant role in shaping retirees' preferences for knowledge and skill enhancement. As individuals transition into retirement, they often have more free time to explore activities they are passionate about (Motegi, *et al.,* 2016). This period presents an opportunity to pursue long-held interests or discover new ones. For instance, a retiree who has always enjoyed painting may take up art classes to improve their technique and engage in creative expression. Similarly, someone fascinated by history might enroll in online courses or join a local history club to deepen their understanding (Vivel-Búa *et al.,* 2019). The key here is that personal interests provide motivation and joy, making the learning process enjoyable and fulfilling. By focusing on activities they love, retirees can experience a sense of purpose and satisfaction, which positively impacts their overall well-being.

2.2.2.2 Technological Proficiency

Technological proficiency greatly influences retirees' preferences for knowledge and skill enhancement. As technology continues to advance, being comfortable with digital tools becomes increasingly important. Some retirees may already be tech-savvy, having used computers, smartphones, and the internet in their professional lives (Xie *et al.,* 2012). These individuals might prefer online learning platforms, webinars, and virtual workshops to expand their knowledge conveniently from home. On the other hand, retirees less familiar with technology may initially find it challenging to navigate digital environments (Ferreira & dos, 2013). However, with the right support and resources, they can develop essential tech skills, opening up a world of online learning opportunities. Community centers, libraries, and senior organizations often offer basic computer courses tailored to older adults, ensuring they can confidently access and benefit from digital resources. Enhancing technological proficiency not only empowers retirees to continue learning but also helps them stay connected with family and friends, reducing feelings of isolation and promoting social engagement.

2.2.2.3 Health and Mobility

Health and mobility significantly impact retirees' choices for knowledge and skill enhancement. Physical health and mobility levels can determine the types of activities they can comfortably engage in. For retirees in good health, the possibilities are vast (Anderson and Mellor, 2008). They might choose to participate in physically

demanding activities such as hiking clubs, dance classes, or sports, which not only provide learning opportunities but also help maintain fitness and vitality. Conversely, retirees with mobility challenges or chronic health conditions may prefer less physically intense activities (Butterworth *et al.,* 2006). For instance, they might opt for book clubs, online courses, or creative writing workshops that allow them to learn and socialize without the need for extensive physical exertion. Adapting to their health needs ensures that retirees can continue to grow and develop their skills in ways that are both enjoyable and sustainable. Additionally, some retirees might focus on learning about health and wellness topics to better manage their conditions and improve their quality of life, further illustrating how health and mobility influence learning preferences.

2.2.2.4 Social Connections and Community Involvement

Social connections and community involvement play a crucial role in shaping retirees' preferences for knowledge and skill enhancement. Engaging with others who share similar interests can be a powerful motivator for learning (Cottier, 2018). Retirees often seek out group activities, classes, or clubs where they can interact with peers, make new friends, and build a supportive network. For example, a retiree interested in gardening might join a local horticultural society, where they can learn new techniques, exchange tips, and participate in community projects. This social aspect adds a layer of enjoyment and fulfillment to the learning process. Community involvement also provides a sense of belonging and purpose, as retirees contribute to local initiatives and support their neighborhoods (Duflo & Saez, 2003). Volunteering can be another avenue for skill enhancement, offering opportunities to develop new competencies while making a positive impact. Whether it’s mentoring youth, assisting in community centers, or participating in environmental conservation efforts, these activities foster personal growth and reinforce the importance of staying active and engaged during retirement (Fasang, 2008).

2.2.2.5 Financial Resources

Financial resources significantly influence retirees' choices for knowledge and skill enhancement. The availability of disposable income can determine the range and quality of learning opportunities accessible to them (Lusardi *et al.,* 2020). Retirees with ample financial resources might choose to invest in formal education, such as enrolling in university courses, attending professional workshops, or participating in

international study programs. These experiences can provide a high level of expertise and exposure to diverse fields. On the other hand, retirees with limited financial means may seek cost-effective or free alternatives, such as community classes, online tutorials, and public library programs (Vivel-Búa *et al.,* 2019). Many educational institutions and organizations offer discounted or free courses for seniors, ensuring that financial constraints do not hinder lifelong learning. Additionally, retirees might explore financial literacy programs to better manage their resources and make informed decisions about their educational investments. By carefully assessing and planning their expenditures, retirees can maximize their learning potential regardless of their financial situation, demonstrating that knowledge and skill enhancement can be tailored to fit various budget levels.

2.2.2.6 Cultural Background and Values

Cultural background and values profoundly shape retirees' preferences for knowledge and skill enhancement. Cultural influences often determine what types of learning and activities are valued and prioritized (Cottier, 2018). For instance, retirees from cultures that highly value education and intellectual pursuits might be more inclined to seek out academic courses, lectures, and seminars. They may have a lifelong appreciation for learning and view retirement as an opportunity to deepen their knowledge in specific areas. Conversely, those from cultures where practical skills and community engagement are emphasized might prefer hands-on activities, such as cooking classes, craftsmanship, or community service projects (Lam *et. al,* 2018). Cultural values also influence how retirees approach learning – whether they prefer individual study, collaborative group settings, or mentorship-based learning. Additionally, cultural diversity can enrich the learning experience by exposing retirees to different perspectives and practices. By embracing their cultural background and values, retirees can engage in meaningful and relevant activities that resonate with their identity and life experiences, making the process of knowledge and skill enhancement deeply fulfilling and culturally aligned (Stebbins, 2000).

2.2.2.7 Past Professional Experience

Past professional experience plays a pivotal role in shaping retirees' preferences for knowledge and skill enhancement. Retirees often draw upon their careers as a foundation for continued learning. Those who had intellectually stimulating professions

might pursue advanced studies or research in their fields of expertise, leveraging their extensive background to delve deeper into specialized topics (Stebbins, 2000). For instance, a retired engineer might take courses in advanced technologies or contribute to academic journals. Conversely, retirees who had hands-on or practical careers might prefer skills-based learning opportunities. A former chef might enjoy taking advanced culinary classes, while a retired carpenter might engage in woodworking projects or teach their craft to others (Motegi, *et al.,* 2016). Retirees also use their professional experience to mentor and guide younger generations, sharing their knowledge and skills through teaching or volunteer work. This transfer of expertise not only enhances their own sense of purpose but also provides valuable learning opportunities for others. By building on their professional background, retirees can continue to grow and contribute meaningfully to their communities.

2.2.2.8 Desire for Personal Growth and Fulfillment

The desire for personal growth and fulfillment is a powerful driver behind retirees' preferences for knowledge and skill enhancement (Genoe *et al.,* 2022). Retirement offers a unique phase of life where individuals can focus on self-improvement and pursuing passions that may have been set aside during their working years. This intrinsic motivation to learn and grow stems from a deep-seated need for self-actualization and personal satisfaction. Retirees often seek activities that challenge them intellectually, emotionally, or creatively, providing a sense of achievement and fulfillment. For example, learning a new language, mastering a musical instrument, or writing a memoir can be deeply rewarding pursuits that enhance one's sense of identity and purpose (Woods *et al.,* 2022). The pursuit of personal growth also contributes to overall well-being, as it keeps the mind active, fosters resilience, and promotes a positive outlook on life. By engaging in meaningful and enriching activities, retirees can experience continuous development and satisfaction, making their retirement years vibrant and fulfilling.

2.2.3 Leisure and personal fulfilment preferences

Factors affecting Leisure and personal fulfilment preferences are as followed:

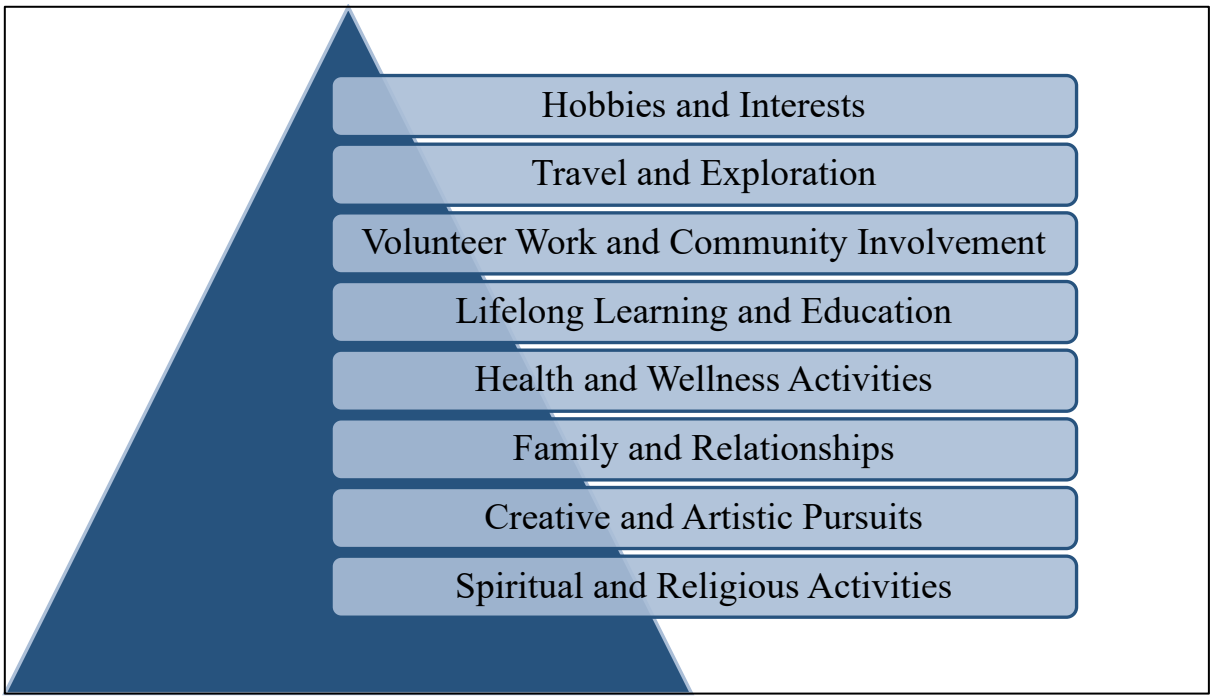

Fig. 2.9: Factors affecting Leisure and personal fulfilment preferences

These factors are explained below:

2.2.3.1 Hobbies and Interests

Hobbies and interests play a significant role in shaping one's leisure and personal fulfillment preferences during retirement. For many individuals, retirement provides the opportunity to dedicate more time to activities they love but might have previously neglected due to work commitments. Engaging in hobbies such as gardening, painting, or playing musical instruments can bring immense joy and satisfaction. These activities not only provide a sense of accomplishment but also help maintain mental sharpness and physical agility (Tomar *et al.*, 2021). Furthermore, hobbies often serve as a means of self-expression, allowing retirees to explore and develop their creative talents. The social aspect of hobbies is equally important; joining clubs or groups centered around shared interests fosters a sense of community and belonging, which is crucial for emotional well-being (Collins & Urban, 2016). For instance, a retiree who loves reading might join a book club, while someone passionate about fitness could become part of a walking group. In essence, hobbies and interests are a cornerstone of personal fulfillment in retirement, offering both personal enrichment and social engagement.

2.2.3.2 Travel and Exploration

Travel and exploration are often high on the list of retirement aspirations, offering a sense of adventure and the chance to experience new cultures and environments (Blazey, 1992). Many retirees view this period of life as an ideal time to see the world, free from the constraints of a work schedule. Whether it's taking long-awaited trips abroad, exploring national parks, or simply visiting different parts of their own country, travel can significantly enhance the quality of life. It provides opportunities for learning and broadening perspectives, which can be intellectually stimulating and personally rewarding. Additionally, travel allows retirees to create lasting memories with loved ones, strengthening familial bonds and friendships. The planning and anticipation of trips can also be exciting, adding to the overall sense of fulfillment. Moreover, travel experiences often lead to personal growth, as individuals step out of their comfort zones and encounter diverse ways of life. For retirees, travel is more than just a leisure activity; it’s a pathway to lifelong learning, adventure, and personal satisfaction.

2.2.3.3 Volunteer Work and Community Involvement

Volunteer work and community involvement are crucial components of leisure and personal fulfillment during retirement. Many retirees seek to give back to their communities, finding purpose and satisfaction in helping others. Volunteering can take many forms, from mentoring young people and assisting in local schools to participating in environmental conservation efforts or supporting charitable organizations. This kind of engagement provides a sense of purpose and accomplishment, which is vital for mental and emotional health. Being involved in the community also helps retirees stay connected socially, combating feelings of isolation and loneliness that can sometimes accompany retirement. Furthermore, volunteer work can introduce retirees to new skills and experiences, keeping their minds active and engaged. It also fosters a sense of belonging and contributes to a positive self-image, as retirees see the tangible impact of their efforts. Overall, community involvement offers retirees a meaningful way to spend their time, enriching their lives and the lives of those around them.

2.2.3.4 Lifelong Learning and Education

Lifelong learning and education are key factors in achieving personal fulfillment during retirement. Many retirees embrace this stage of life as an opportunity to pursue

educational interests that were put on hold during their working years. Engaging in lifelong learning can take many forms, such as enrolling in university courses, attending workshops, or participating in online learning platforms. This pursuit not only keeps the mind sharp and engaged but also satisfies intellectual curiosity and a desire for personal growth. Additionally, learning new skills or acquiring knowledge in areas of interest can boost self-confidence and provide a sense of achievement. Lifelong learning also offers social benefits; retirees can meet like-minded individuals and form new friendships through educational activities. For example, joining a history class or a creative writing group can create opportunities for social interaction and shared experiences. Ultimately, lifelong learning enriches the retirement experience by fostering intellectual stimulation, personal development, and social connections.

2.2.3.5 Health and Wellness Activities

Health and wellness activities are essential for personal fulfillment in retirement, as they contribute to both physical and mental well-being (Butterworth *et al.,* 2006). Retirees often have more time to focus on maintaining their health, engaging in regular exercise, and adopting healthier lifestyles. Activities such as yoga, swimming, or even daily walks can significantly improve physical fitness and mobility, enhancing the quality of life. Additionally, health and wellness pursuits often include mindfulness practices like meditation or tai chi, which help reduce stress and promote emotional balance (Anderson and Mellor, 2008). These activities not only improve physical health but also provide a sense of routine and purpose. Social aspects of wellness activities, such as joining fitness classes or walking groups, further enhance personal fulfillment by fostering community connections and reducing feelings of loneliness. Moreover, prioritizing health in retirement can lead to greater independence and the ability to enjoy other leisure activities fully. Thus, health and wellness activities are a cornerstone of a fulfilling retirement, supporting both body and mind.

2.2.3.6 Family and Relationships

Family and relationships play a pivotal role in determining leisure and personal fulfillment preferences during retirement. For many retirees, spending quality time with family, including children and grandchildren, is a top priority. These interactions provide emotional support, joy, and a sense of continuity and belonging. Engaging in family activities, such as family vacations, holiday gatherings, or simply regular visits,

strengthens bonds and creates cherished memories. Additionally, maintaining and nurturing long-term friendships or even forming new ones can greatly enhance a retiree's social life and overall happiness. Social connections are crucial for emotional health, helping to prevent feelings of isolation and loneliness. In some cases, retirees might also become caregivers for family members, which, while challenging, can offer a profound sense of purpose and fulfillment. Furthermore, close relationships provide a support network that can help retirees navigate the transitions and challenges of this life stage. Overall, strong family ties and friendships are integral to a fulfilling and enjoyable retirement, providing love, support, and a sense of community.

2.2.3.7 Creative and Artistic Pursuits

Creative and artistic pursuits can be a major source of personal fulfillment during retirement. Many individuals find that they finally have the time to explore and develop their creative talents, whether in painting, writing, music, or crafts. These activities provide an outlet for self-expression and can be deeply satisfying. Engaging in creative pursuits also offers cognitive benefits, helping to keep the mind sharp and improving problem-solving skills. Additionally, artistic activities can be therapeutic, reducing stress and promoting emotional well-being. Retirees might choose to take classes or join groups related to their interests, providing opportunities for social interaction and community building. Exhibiting or sharing their work can also bring a sense of accomplishment and recognition. For example, a retiree who takes up photography might join a photography club, participate in exhibitions, or simply enjoy capturing moments for personal enjoyment. Overall, creative and artistic pursuits enrich the retirement experience by fostering self-expression, cognitive engagement, and emotional satisfaction.

2.2.3.8 Spiritual and Religious Activities

Spiritual and religious activities are important for many retirees, offering a sense of peace, purpose, and community. Engaging in regular practices such as prayer, meditation, attending religious services, or participating in spiritual study groups can provide a strong foundation of inner strength and tranquility. These activities help retirees find meaning and purpose in their daily lives, which is crucial for overall well-being. Additionally, being part of a religious or spiritual community offers social support and a sense of belonging, reducing feelings of isolation. Participating in

communal worship or spiritual gatherings can also provide opportunities for volunteering and service, which further enhances a sense of purpose and fulfillment. For many, spiritual and religious activities offer a way to connect with others who share similar values and beliefs, fostering deep and meaningful relationships. Overall, spirituality and religion can play a vital role in enriching the retirement experience, providing emotional and social support, and helping retirees navigate the challenges of this life stage with grace and resilience.

2.3 POST-RETIREMENT EXPECTATIONS

The level of expectation towards retirement might vary significantly among individuals, depending on their own circumstances, goals, and financial preparations.

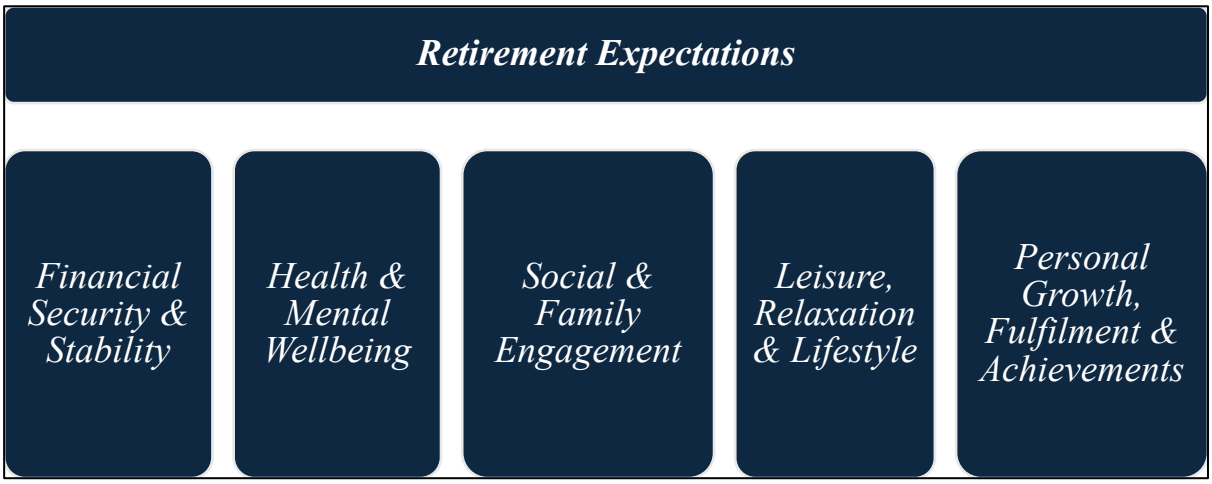

Fig 2.10: Post Retirement Expectations

The subsequent points encompass customary retirement anticipations and deliberations:

2.3.1 Financial security and stability

Following factors (Fig 2.11) affect financial security and stability expectations for retired life. These factors are discussed below:

2.3.1.1 Savings and Investments

Savings and investments play a pivotal role in achieving financial security and stability during retirement. Individuals who diligently save and invest over the course of their working lives are better positioned to handle the financial demands of retirement. The importance of starting early cannot be overstated, as compound interest significantly boosts the growth of savings over time. A diverse investment portfolio, which includes stocks, bonds, and real estate, can help mitigate risks and enhance returns.

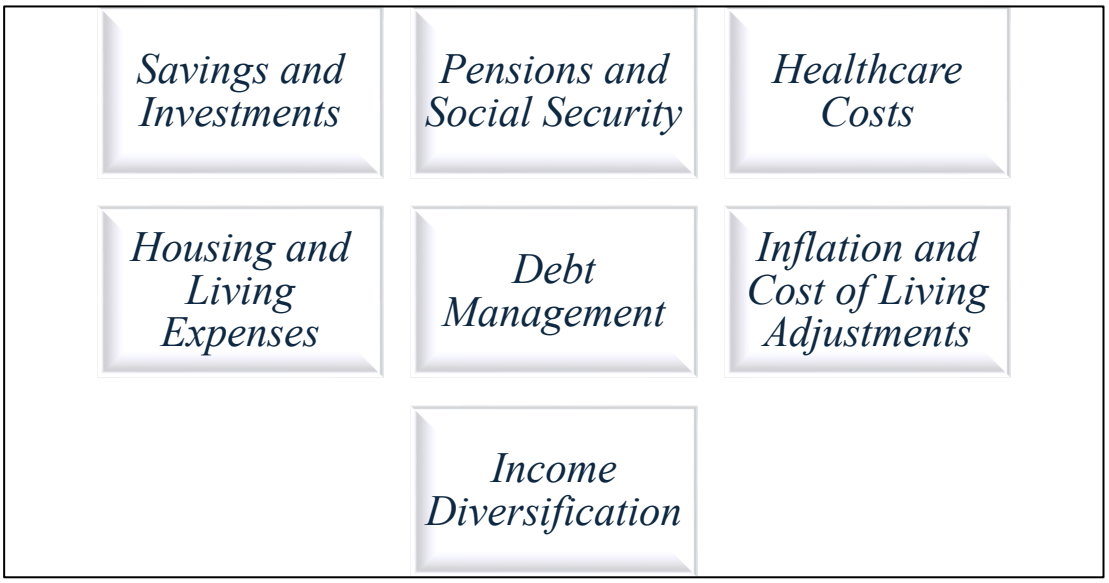

Fig. 2.11: Factors affecting financial security and stability expectations

Additionally, having a clear understanding of retirement goals and expenses allows individuals to plan effectively. This includes estimating the costs of healthcare, housing, leisure activities, and potential long-term care needs. Regularly reviewing and adjusting one's financial plan is crucial to ensure it aligns with changing circumstances and market conditions. Moreover, consulting with financial advisors can provide valuable insights and strategies to optimize savings and investment efforts. Ultimately, the combination of disciplined saving, smart investing, and proactive financial planning forms the bedrock of financial security in retirement, providing a buffer against economic uncertainties and ensuring a comfortable and stress-free retirement.

2.3.1.2 Pensions and Social Security

Pensions and Social Security benefits are essential components of financial security for retirees, providing a steady and reliable income stream. For many, these benefits form the foundation of their retirement income, supplementing personal savings and investments. The predictability of these payments can significantly reduce financial anxiety, allowing retirees to focus on enjoying their retirement years.

Defined benefit pensions, which promise a specific payout upon retirement, are particularly valuable. However, the availability and generosity of such plans have been declining, with many employers shifting to defined contribution plans, like 401(k)s. Understanding the specifics of one's pension plan, including vesting schedules and payout options, is crucial for effective retirement planning.

Social Security benefits also play a vital role, especially for those with limited other income sources. The timing of when to start claiming Social Security can have a significant impact on the total benefits received. Delaying benefits can increase monthly payments, while starting earlier can provide immediate income but reduce the monthly amount. It's important for individuals to assess their health, life expectancy, and financial needs when deciding when to claim Social Security.

Ultimately, maximizing pension and Social Security benefits requires careful planning and strategic decision-making. By understanding these benefits and integrating them into a comprehensive retirement plan, individuals can ensure a more secure financial future.

2.3.1.3 Healthcare Costs

Healthcare costs are a major concern for retirees, significantly impacting their financial security and stability. As people age, the likelihood of requiring medical care increases, and the expenses associated with healthcare can be substantial. This includes routine medical check-ups, prescription medications, emergency care, and long-term treatments for chronic conditions (Anderson and Mellor, 2008). Therefore, having a robust plan to cover healthcare costs is essential for maintaining financial stability in retirement.

Health insurance is a critical component of this plan. For those aged 65 and older, Medicare provides substantial coverage, but it does not cover all medical expenses. Understanding the different parts of Medicare (Part A, Part B, Part C, and Part D) and the coverage each offers is crucial. Additionally, purchasing supplemental insurance, known as Medigap, can help cover the costs that Medicare does not, such as copayments, deductibles, and medical care when traveling outside the U.S.

Long-term care insurance is another consideration, as it helps cover the costs of services that assist with daily living activities, which are not typically covered by regular health insurance or Medicare. Without adequate coverage, the cost of long-term care can quickly deplete retirement savings (Butterworth *et al.,* 2006).

Planning for healthcare costs also involves maintaining a healthy lifestyle to minimize medical expenses. Regular exercise, a balanced diet, and preventive care can reduce the likelihood of severe health issues and lower overall healthcare costs. By proactively

managing healthcare expenses through insurance and healthy living, retirees can protect their financial security and enjoy a more stable and worry-free retirement.

2.3.1.4 Housing and Living Expenses

Housing and living expenses constitute a significant portion of a retiree's budget and have a direct impact on financial security and stability. For many, housing is the largest single expense, and managing this cost effectively is crucial. This includes mortgage payments, property taxes, insurance, utilities, and maintenance. Therefore, having a clear plan for housing in retirement is essential.

One option is to pay off the mortgage before retiring, which can substantially reduce monthly expenses and free up funds for other needs. Downsizing to a smaller, more manageable home can also lower costs and reduce the physical burden of maintenance. Additionally, some retirees choose to relocate to areas with a lower cost of living, which can significantly stretch their retirement savings.

Living expenses extend beyond housing and include everyday costs such as food, transportation, and utilities. Creating a detailed budget that accounts for these expenses helps retirees manage their finances more effectively. It is also important to consider potential changes in living expenses over time, such as the need for increased healthcare or long-term care.

Inflation is another factor that can erode purchasing power over time. Planning for inflation by investing in assets that traditionally outpace inflation, such as stocks or real estate, can help maintain financial stability. Additionally, having an emergency fund to cover unexpected expenses can prevent financial disruptions and provide peace of mind.

In summary, managing housing and living expenses through careful planning, budgeting, and strategic decisions can help retirees achieve financial security and stability, ensuring they can live comfortably within their means throughout their retirement years.

2.3.1.5 Debt Management

Effective debt management is crucial for financial security and stability in retirement. Carrying significant debt into retirement can strain fixed income sources and increase financial stress. Therefore, prioritizing debt reduction before retiring is a key strategy for ensuring a secure financial future.

This process starts with a thorough assessment of all outstanding debts, including mortgages, credit cards, personal loans, and any other liabilities. Creating a repayment plan that targets high-interest debts first can reduce the overall interest paid and accelerate debt elimination. For many, focusing on paying off high-interest credit card debt is essential, as the interest rates on these balances can quickly accumulate.

Mortgage debt is another significant consideration. Paying off the mortgage before retiring can greatly reduce monthly expenses, freeing up funds for other needs. If paying off the mortgage isn't feasible, refinancing to a lower interest rate or extending the loan term might be beneficial to reduce monthly payments.

In addition to repaying existing debt, avoiding new debt is equally important. Living within one's means and maintaining a strict budget helps prevent the accumulation of new debt. Utilizing credit cards responsibly, such as paying off the balance in full each month, can also help manage debt effectively.

Financial literacy plays a significant role in debt management. Understanding the terms of loans and credit, the impact of interest rates, and the importance of timely payments can help individuals make informed decisions and avoid financial pitfalls.

By actively managing and reducing debt, retirees can improve their financial security and stability, ensuring they can enjoy their retirement without the burden of debt-related stress.

2.3.1.6 Inflation and Cost of Living Adjustments

Inflation and cost of living adjustments are critical factors affecting financial security and stability in retirement. Inflation erodes the purchasing power of money over time, meaning that the same amount of money will buy fewer goods and services in the future. This can significantly impact retirees, who often live on fixed incomes.

Planning for inflation involves understanding its potential impact and incorporating strategies to mitigate it. One common approach is to invest in assets that traditionally outpace inflation, such as stocks, real estate, and certain types of bonds. These investments can help grow savings and maintain purchasing power over time. Diversification across different asset classes also helps manage risk and protect against market volatility.

Cost of living adjustments (COLAs) are often applied to Social Security benefits and some pensions to help counteract the effects of inflation. These adjustments increase

the amount of benefits received to reflect rising prices. However, not all pensions include COLAs, so it's important for individuals to understand their specific retirement plans and the extent to which they will adjust for inflation.

Budgeting with inflation in mind is also crucial. Retirees should regularly review and adjust their budgets to account for rising costs in areas such as healthcare, housing, and everyday living expenses. Having a financial cushion or emergency fund can provide additional security against unexpected inflationary pressures.

In summary, anticipating and planning for inflation through strategic investments, understanding cost of living adjustments, and maintaining a flexible budget are essential steps for ensuring financial security and stability in retirement. These measures help retirees preserve their purchasing power and maintain their standard of living despite the gradual increase in prices over time.

2.3.1.7 Income Diversification

Income diversification is a vital strategy for achieving financial security and stability in retirement. Relying on a single source of income can be risky, as changes in the economy, policy, or personal circumstances can disrupt that income stream. Diversifying income sources helps mitigate this risk and ensures a more stable and reliable financial foundation.

Social Security benefits are a common income source for many retirees, but they are often not enough to cover all expenses. Pensions, if available, provide another steady income stream. However, the decline in employer-provided pensions means that many retirees must look to other sources of income.

Personal savings and investments play a crucial role in income diversification. This can include dividends from stocks, interest from bonds, and rental income from real estate properties. Each of these sources can provide regular income that supplements Social Security and pensions. Additionally, having a diversified investment portfolio can help manage risk and ensure more consistent returns over time.

Part-time work or freelance opportunities can also contribute to income diversification. Many retirees choose to work part-time to stay active and engaged while earning additional income. This can also provide a sense of purpose and social interaction, enhancing overall well-being.

Annuities are another option for generating income in retirement. These financial products can provide guaranteed income for life or a set period, helping to ensure financial stability.

In conclusion, income diversification through a combination of Social Security, pensions, personal investments, part-time work, and annuities can significantly enhance financial security and stability in retirement.

2.3.2 Health and mental well being

By prioritizing mental health awareness and management, retirees can enjoy a higher quality of life, better health outcomes, and a more satisfying retirement experience. Factors affecting this is:

Fig. 2.12: Factors affecting health and mental well being expectations

These factors are explained below:

2.3.2.1 Financial Security

Financial security is paramount when considering health and mental well-being in retirement. Without adequate financial resources, retirees may face significant stress, which can negatively impact both physical and mental health. Financial security encompasses savings, investments, pensions, and social security benefits. Those who have planned well and built a solid financial foundation can afford healthcare services, medications, and even lifestyle activities that contribute to overall well-being.

Moreover, financial security allows retirees to make healthier lifestyle choices, such as purchasing nutritious food, engaging in fitness activities, and seeking preventive medical care. Without worrying about finances, retirees are more likely to participate

in social and recreational activities, which are vital for mental health. On the other hand, financial instability can lead to anxiety, depression, and a sense of helplessness. It can also limit access to necessary healthcare services, exacerbating health issues. Thus, ensuring financial security before retirement is a critical factor in maintaining both physical health and mental well-being during the retirement years.

2.3.2.2 Access to Quality Healthcare

Access to quality healthcare is a fundamental factor affecting retirees' health and mental well-being. This includes having comprehensive health insurance that covers a wide range of medical services, from routine check-ups and preventive care to specialist visits and emergency treatments. Medicare and Medicaid play crucial roles in providing affordable healthcare options for retirees, but understanding and navigating these programs can be complex (Butterworth *et al.,* 2006).

Quality healthcare ensures that retirees can manage chronic conditions effectively, receive timely treatments, and access necessary medications. Regular interactions with healthcare providers can help in early detection and management of health issues, preventing them from becoming severe (Anderson and Mellor, 2008). Additionally, having access to mental health services, such as counseling and therapy, supports emotional and psychological well-being.

Retirees who can easily access quality healthcare tend to have better health outcomes and a higher quality of life. They experience less stress related to health concerns and are more likely to engage in proactive health behaviors. Conversely, limited access to healthcare can lead to untreated health issues, increased medical expenses, and significant emotional distress. Therefore, ensuring access to quality healthcare is essential for promoting health and mental well-being in retirement.

2.3.2.3 Social Connections and Support

Social connections and support systems play a crucial role in the health and mental well-being of retirees. As individuals transition out of the workforce, they often lose daily social interactions that were part of their work environment (Gustman & Steinmeier, 2002). Maintaining strong social ties with family, friends, and community members can help fill this void and provide emotional support. Social engagement through activities such as volunteering, joining clubs, or participating in community events helps retirees stay mentally active and connected.

Loneliness and social isolation are significant risk factors for mental health issues, including depression and anxiety. Having a robust support network can mitigate these risks, providing a sense of belonging and purpose (Sharif & Naghavi, 2020). Social interactions stimulate cognitive functions, helping to maintain mental sharpness and prevent cognitive decline. Additionally, social connections can encourage healthier behaviors, as peers and family members can motivate each other to stay active and eat well.

In retirement, it's essential to nurture existing relationships and seek new social opportunities. This proactive approach to social engagement can significantly enhance emotional well-being and contribute to a fulfilling retirement experience.

2.3.2.4 Healthy Lifestyle Choices

Adopting and maintaining healthy lifestyle choices is fundamental to ensuring good health and mental well-being in retirement. This encompasses a balanced diet, regular physical activity, sufficient sleep, and avoiding harmful habits like smoking and excessive alcohol consumption (Motegi, *et al.,* 2016). As individuals age, their bodies require different nutritional needs, and a diet rich in fruits, vegetables, whole grains, and lean proteins supports overall health.

Regular physical activity, such as walking, swimming, or yoga, is crucial for maintaining mobility, strength, and cardiovascular health. Exercise also has a positive impact on mental health by reducing stress, anxiety, and symptoms of depression. It promotes the release of endorphins, which are natural mood lifters.

Adequate sleep is another critical component, as poor sleep quality can lead to cognitive decline and exacerbate health issues (Vivel-Búa *et al.,* 2019). Avoiding harmful habits, such as smoking and excessive drinking, reduces the risk of chronic diseases and supports longevity.

By committing to healthy lifestyle choices, retirees can prevent many common age-related health issues, maintain higher energy levels, and enhance their overall quality of life. These habits not only benefit physical health but also contribute significantly to mental and emotional well-being.

2.3.2.5 Mental Health Awareness and Management

Awareness and proactive management of mental health are essential for retirees to enjoy a fulfilling and healthy retirement (Banhato *et al.,* 2015). Mental health issues

such as depression, anxiety, and cognitive decline are common among older adults, but they often go unrecognized and untreated. Regular mental health check-ups and access to counseling or therapy can help address these issues early on.

Mindfulness practices, such as meditation and stress management techniques, can be beneficial. They help retirees manage the stress and anxiety that can come with the transition to retirement and the changes it brings (Anderson & Mellor, 2008). Engaging in mentally stimulating activities, such as reading, puzzles, or learning new skills, can also keep the mind sharp and reduce the risk of cognitive decline.

It's also important for retirees to understand the signs of mental health issues and not hesitate to seek help. Support groups and community resources can provide additional assistance and foster a sense of community and understanding (Vo & Phu-Duyen, 2023). Maintaining a positive outlook and practicing gratitude can improve overall mental health and resilience.

2.3.3 Social and family engagement

Four key factors affecting Social and family engagement expectations for retirement. These factors are:

Fig. 2.13: Factors affecting social and family engagement expectations

These factors are explained below:

2.3.3.1 Social Networks and Community Involvement

As individuals approach retirement, the structure and quality of their social networks become increasingly important. Social networks, encompassing friends, acquaintances, and community connections, play a crucial role in maintaining social engagement during retirement (Jenkins *et al.,*2002). The transition from a work-centric life to retirement often involves a shift in social interactions. Those who actively participate

in community groups, clubs, or volunteer opportunities tend to have richer social lives. Engaging in local activities provides opportunities to meet new people and build meaningful relationships, which can be particularly valuable as traditional work-related social interactions diminish (Woods *et al.,* 2022). Moreover, involvement in community activities can offer a sense of purpose and belonging, which is vital for emotional well-being. Retirees who embrace community involvement are often more satisfied with their social lives and experience less loneliness. Thus, the ability to maintain and expand social networks significantly influences one's social engagement and overall satisfaction in retirement.

2.3.3.2 Family Dynamics and Proximity

Family dynamics and proximity play a critical role in shaping social engagement expectations for retirement. As individuals retire, the ability to maintain close family relationships becomes increasingly important. The presence of supportive family members nearby can enhance social interaction and provide emotional support (Wang & Shi, 2014). For many retirees, the proximity of children, grandchildren, and extended family members can directly impact their social well-being. Families that are geographically dispersed may face challenges in maintaining frequent contact, which can lead to feelings of isolation. Conversely, retirees who live close to their family members often benefit from regular visits, shared activities, and daily interactions that contribute to a sense of connection and support (Gustman & Steinmeier, 2002). Additionally, family dynamics, such as the quality of relationships and the level of support from family members, can influence retirees' expectations and satisfaction with their social engagement. Positive family relationships and frequent contact with loved ones can greatly enhance the social experience of retirement.

2.3.3.3 Health and Mobility

Health and mobility significantly affect retirees' ability to engage socially and maintain active family connections. As individuals age, physical health conditions and mobility limitations can impact their capacity to participate in social activities and visit family members (Phillips & Weir, 2023). Health issues such as chronic illnesses, arthritis, or mobility impairments can restrict one's ability to leave the house, attend social gatherings, or travel to visit family. This limitation can result in reduced social interaction and increased feelings of isolation. Retirees with good health and mobility

are more likely to stay active, attend social events, and maintain strong family relationships. Conversely, those facing health challenges may need to adapt their social activities and find alternative ways to connect with others, such as through virtual means or home visits (De Nardi *et al.,* 2016). Ensuring access to appropriate healthcare, supportive services, and mobility aids can help retirees manage health-related barriers to social engagement and maintain meaningful connections.

2.3.3.4 Financial Resources

Financial resources are a fundamental factor influencing social and family engagement expectations in retirement. The financial security of retirees affects their ability to participate in social activities, travel to visit family, and engage in recreational pursuits (Siegel, 2021). Adequate financial resources allow retirees to afford expenses related to socializing, such as dining out, attending events, or joining clubs and organizations. Conversely, financial constraints can limit retirees' options for social engagement, leading to fewer opportunities for interaction and potentially contributing to feelings of isolation (Lingyan *et al.,* 2021). Financial stability also impacts retirees' ability to support family members in need, which can influence family dynamics and relationships. Those with sufficient resources may have more flexibility to engage in social activities, travel to family gatherings, and maintain an active lifestyle. In contrast, financial limitations can restrict these opportunities and affect overall satisfaction with social and family engagement in retirement (Sharif & Naghavi, 2020). Thus, financial planning and management are essential for ensuring a fulfilling social life during retirement.

2.3.4 Leisure, relaxation and lifestyle

Factors affecting leisure and lifestyle expectations are:

Fig. 2.14: Factors affecting leisure, relaxation and lifestyle expectations

These factors are explained below:

2.3.4.1 Financial Resources

Financial resources play a critical role in shaping retirement leisure and lifestyle expectations. The amount of savings and income a retiree has significantly impacts their ability to enjoy leisure activities and relaxation (French & Jones, 2011). Those with ample financial resources often envision a retirement filled with travel, fine dining, and various hobbies that require financial investment. For example, they may plan extensive trips abroad, indulge in expensive hobbies like sailing or golf, or frequent high-end restaurants and theaters. Conversely, retirees with limited financial means may have more modest expectations, focusing on low-cost or free activities such as community events, local parks, or home-based hobbies. The disparity in financial resources can affect not only the type of activities retirees engage in but also their overall satisfaction with retirement (McDonald & Donahue, 2000). Planning for a secure financial future is essential for ensuring that leisure and lifestyle expectations align with financial reality, allowing retirees to enjoy their desired activities without undue stress or financial strain.

2.3.4.2 Health and Mobility

Health and mobility are pivotal in determining the types of leisure activities and lifestyle choices retirees can realistically pursue. Good health and physical fitness open the door to a wide range of activities, from hiking and biking to traveling and participating in sports. Retirees in good health might envision an active retirement filled with adventurous activities, social events, and physical exercise (Vo & Phu-Duyen, 2023). However, for those with health limitations or mobility issues, expectations may shift towards activities that are more accessible and less physically demanding. This might include indoor hobbies like reading, crafting, or participating in social groups that meet in accessible locations. Health conditions can also influence the choice of accommodations and travel destinations, with some retirees opting for places that cater to their specific needs (Anderson & Mellor, 2008). Ultimately, maintaining good health is crucial for retirees to fully engage in their preferred leisure activities and enjoy a fulfilling lifestyle during their retirement years.

2.3.4.3 Social Connections

The presence and quality of social connections deeply impact leisure and lifestyle expectations for retirement. Retirees who maintain strong relationships with family, friends, and community members often find their retirement years more enjoyable and fulfilling. Social interactions can enhance the retirement experience by providing opportunities for shared activities, companionship, and support (Vo & Phu-Duyen, 2023). For example, retirees who are actively involved in social groups, clubs, or volunteer organizations may anticipate a retirement filled with group activities, social gatherings, and community engagement. On the other hand, those with limited social networks might face challenges in finding fulfilling ways to spend their time (Gustman & Steinmeier, 2002). Building and nurturing social connections before and during retirement can significantly affect one's overall satisfaction and engagement in leisure activities. Retirees who have a robust support system are more likely to have a vibrant and socially enriched retirement lifestyle.

2.3.4.4 Personal Interests and Hobbies

Personal interests and hobbies shape retirement leisure and lifestyle expectations by defining how retirees choose to spend their free time. Individuals often look forward to having more time to devote to their passions and interests once they retire. Those with long-standing hobbies, such as gardening, painting, or playing music, may anticipate spending ample time on these activities, which can be both relaxing and fulfilling (Wang & Shi, 2014). Retirees may also explore new interests that they did not have time for during their working years, such as learning a new language, taking up cooking classes, or engaging in creative writing. The alignment of personal interests with available time and resources in retirement can greatly influence how retirees view their future leisure activities (Gustman & Steinmeier, 2002). Additionally, retirees often find joy in pursuing activities that provide a sense of purpose or accomplishment, which can significantly enhance their overall quality of life and satisfaction with retirement.

2.3.5 Personal growth, fulfilment and achievements

Factors like sense of purpose, health and vitality, financial security, and social connections, each play a significant role in shaping expectations for personal growth and fulfilment in retirement.

Fig. 2.15: Factors affecting personal growth, fulfilment and achievements expectations

By addressing these areas, retirees can better prepare for a rewarding and meaningful retirement experience. Factors are discussed below:

2.3.5.1 Sense of Purpose

Retirement often comes with a shift in daily routines and long-standing roles, which can initially create a void in one's sense of purpose. A key factor in achieving personal growth and fulfilment in retirement is finding new ways to contribute and stay engaged. For many retirees, purpose is derived from continuing to pursue passions or interests that were sidelined during their working years (Ding *et al.,* 2016). This might involve engaging in hobbies, volunteering, or even starting a new business or project. Purpose can also come from mentoring others, sharing knowledge, or participating in community activities. Establishing a sense of purpose not only enriches one's own life but can also positively impact others (Browne *et al.,* 2019). It provides a meaningful structure to the days and fosters a sense of accomplishment and satisfaction. Without this sense of direction, retirees might struggle with feelings of emptiness or lack of motivation, making the search for purpose a crucial aspect of a fulfilling retirement.

2.3.5.2 Health and Vitality

Good health is foundational to enjoying a fulfilling retirement. As individuals age, maintaining physical and mental health becomes increasingly important for personal growth and achievement. Health challenges can limit one's ability to engage in activities and pursue new goals. Therefore, retirees who prioritize their health through regular exercise, a balanced diet, and routine medical check-ups are better positioned to explore new opportunities and enjoy their retirement years fully (Etgeton *et al.,*2023). Vitality

and energy levels directly influence one's capacity to take on new challenges, learn new skills, and engage in social activities. Furthermore, mental health plays a significant role; managing stress, staying mentally active, and cultivating a positive outlook contribute to overall well-being. A healthy lifestyle not only extends the quality of life but also enhances the ability to achieve personal goals and experience fulfilment in retirement.

2.3.5.3 Financial Security

Financial stability is a critical factor in shaping expectations for personal growth and fulfilment in retirement. When retirees have a secure financial foundation, they have the freedom to explore new interests and engage in activities that bring them joy and satisfaction without the stress of financial constraints (French & Jones, 2011). Financial security allows retirees to invest in experiences such as travel, education, or hobbies that might have been difficult to afford while working. It also provides the flexibility to make lifestyle choices that align with their goals, such as relocating to a desired location or pursuing volunteer opportunities (McDonald & Donahue, 2000). On the other hand, financial uncertainty can limit opportunities and create stress, hindering one's ability to fully embrace retirement. Thus, planning and managing finances wisely can significantly impact the ability to achieve a fulfilling and enriched retirement experience.

2.3.5.4 Social Connections

Strong social connections are vital for personal growth and fulfilment during retirement (Woods, *et al.,* 2022). The transition from a structured work environment to retirement can sometimes lead to social isolation, which affects emotional well-being and overall satisfaction. Engaging with a supportive network of family, friends, and community groups can provide emotional support, companionship, and a sense of belonging. Retirees who actively participate in social activities, join clubs or groups, and maintain relationships often find greater joy and meaning in their retirement years (Janssen *et al.,* 2013). Social interactions can also offer opportunities for personal development, learning, and shared experiences, contributing to a richer and more fulfilling retirement. Building and nurturing these connections helps retirees stay engaged, feel valued, and find purpose in their new phase of life.

2.4 RETIREMENT SATISFACTION MEASURES

There exist several indicators to assess the level of contentment individuals have throughout their retirement period. According to Diener et al. (2018), an individual's well-being can be best reflected by improvements in their financial, physical, and emotional states. The perception of well-being is subject to individual variation and is influenced by personal experiences and qualities (Rado & Boissonneault, 2018).

2.4.1 Financial satisfaction

Financial well-being refers to an individual's state of economic stability and security. It encompasses several aspects such as income, savings, investments, and overall financial health (Ang *et al.,* 2023).

The level of financial well-being is closely linked to the degree of retirement satisfaction, as an individual's financial situation during retirement significantly impacts their overall pleasure and well-being during this phase of life. Financial well-being is a comprehensive concept that encompasses all aspects of an individual's financial health (Amorim & França, 2019). It holds significant relevance in relation to one's overall satisfaction during retirement. Financial well-being affects retirement happiness in the following ways:

2.4.1.1 Financial Security

Financial security refers to the state of being financially stable and protected from any economic risks or uncertainties (Nawi et al., 2023). Ensuring an adequate amount of financial resources during retirement is essential for maintaining a sense of security and tranquilly, as it enables individuals to cover essential living expenses, medical costs, housing expenses, and engage in leisure activities. Retirees who are financially stable are more likely to be content with their retirement lifestyle.

2.4.1.2 Savings and investments

The accumulation of savings and investments, including retirement accounts and various assets, plays a significant role in enhancing an individual's financial stability throughout their retirement years (Tamborini & Kim, 2020). These technologies have the potential to provide individuals with financial autonomy, as well as assistance in achieving retirement goals and engaging in various activities.

2.4.1.3 Retirement income

The adequacy of retirement income, encompassing pension disbursements, Social Security entitlements, and withdrawals from retirement savings accounts, exerts a direct impact on the level of satisfaction experienced during retirement (Scott *et al.*, 2020). The presence of a reliable and stable source of income has the potential to enhance an individual's overall state of well-being.

The burden of debt and financial obligations can significantly affect the level of satisfaction experienced after retirement (Engen et al. ,2004). Retirees burdened with significant debt may experience heightened levels of stress and diminished levels of happiness.

The experience of reduced retirement satisfaction may be attributed to financial stress arising from factors such as inadequate income, unexpected expenses, or financial instability. The mitigation of financial stress is a crucial element in achieving overall well-being.

2.4.1.4 Long-Term Financial Planning:

Long-term financial planning is a strategic process that involves the formulation and implementation of financial strategies and goals over an extended period of time (Angrisani & Casanova, 2021). There is a higher likelihood of retired folks experiencing a sense of financial control and enhanced happiness if they have engaged in a financial planning process and have established a well-defined retirement strategy.

2.4.2 Physical health and well-being

Physical well-being refers to the state of an individual's physical health and overall condition. The impact of physical well-being on retirement satisfaction is significant, since it directly influences the retiree's quality of life and overall sense of contentment throughout their post-employment years. The examination of physical well-being as a component of retirement satisfaction necessitates the assessment of several aspects pertaining to an individual's physical health and overall wellbeing. When assessing retirement satisfaction in relation to physical well-being, it is important to take into account the following key factors:

2.4.2.1 The individual's current state of health

The physical well-being of a retiree is significantly influenced by their physical health. This approach include the evaluation of chronic illnesses, impairments, overall health,

and any limitations on daily activities. The activities of daily living (ADLs) refer to the routine tasks that individuals engage in on a daily basis to maintain their personal well-being and independence (Ding *et al.,* 2016). These activities encompass a range of essential self-care tasks, such as bathing, dressing or grooming.

The ability to autonomously engage in essential activities of daily life, such as personal hygiene, dressing, eating, and mobility, is a significant determinant of physical well-being during the retirement period.

2.4.2.2 Access to Healthcare

Access to high-quality medical care, which encompasses regular check-ups, specialised interventions, and essential medications, plays a crucial role in maintaining optimal physical health. The topic of mental health is of significant importance and has garnered considerable attention in academic and research circles (De Nardi *et al.,* 2016). The state of mental health is intricately interconnected with one's total state of well-being. The evaluation of depression, anxiety, and stress levels is of utmost importance due to their potential to exert bodily effects and thus, influence total retirement satisfaction.

The provision of efficient pain management, whether stemming from chronic illnesses or accidents, has paramount importance for the maintenance of physical health and has the potential to enhance overall enjoyment during retirement (Miah & Wilcox-Gök, 2007).

Preventive healthcare refers to the measures taken to proactively address and mitigate potential health issues before they arise. Engaging in preventative healthcare measures, such as receiving immunisations and undergoing screenings, can contribute to the maintenance of physical well-being and the prevention of potential health issues.

Maintaining a well-rounded and nourishing dietary regimen is crucial for preserving optimal physical health during the retirement phase. A healthy diet has been shown to enhance energy levels, improve immune function, and promote overall well-being.

2.4.2.3 Physical Activity and Exercise:

There exists a positive correlation between engaging in regular physical activity and exercise and experiencing an overall improvement in physical well-being (Ding *et al.,* 2016). This improvement encompasses several aspects such as enhanced cardiovascular health, increased muscle strength, and greater flexibility. Sufficient and tranquil sleep

is crucial for both physical and mental well-being. Sleep disturbances or disorders can have a negative impact on physical health and overall well-being.

2.4.3 Social Satisfaction

Social satisfaction has following measures:

2.4.3.1 Maintaining Social Connections

One of the key measures of social satisfaction in retirement is the ability to maintain and nurture social connections. As individuals transition into retirement, their daily interactions shift from a workplace environment to a more home-based or community-oriented lifestyle (Jenkins *et al.,*2002). This shift can sometimes lead to a sense of isolation if not managed actively. Maintaining social connections involves staying in touch with friends and family, participating in social groups, and engaging in community activities. Regular interaction with loved ones and peers can provide emotional support, reduce feelings of loneliness, and create a sense of belonging. Social satisfaction is closely tied to the quality and quantity of these interactions (Van Holle *et al.,* 2014). Retirees who actively make an effort to reach out, organize gatherings, or join clubs and organizations often report higher levels of satisfaction. It is not just about the frequency of interactions but also the depth and quality of these relationships that contribute to a fulfilling social life. Building and sustaining these connections can help retirees feel valued, loved, and integrated into a social network, which is essential for their overall well-being and happiness.

2.4.3.2 Engaging in Community Activities

Another significant measure of social satisfaction is active engagement in community activities. This involves participating in local events, volunteering, or joining community organizations and groups (Butterworth *et al.,* 2006). By getting involved in community activities, retirees can contribute their time and skills to causes they care about, which can provide a strong sense of purpose and fulfillment. Community involvement also offers opportunities to meet new people, build relationships, and create a support network outside of family and lifelong friends. Whether it's joining a book club, participating in a gardening group, or volunteering at a local charity, these activities help retirees stay active and socially engaged (Jenkins *et al.,*2002). The benefits of community participation extend beyond mere interaction; it fosters a sense of belonging and achievement. It helps retirees feel they are making a positive impact,

which is a crucial element of social satisfaction. Engaging in community life can also combat feelings of isolation and provide a structured routine that enriches their daily experiences.

2.4.3.3 Participating in Lifelong Learning

Lifelong learning is an important aspect of social satisfaction during retirement. This can include enrolling in classes, attending lectures, or pursuing new hobbies and interests. Engaging in educational activities stimulates the mind, keeps retirees intellectually engaged, and provides opportunities to meet others with similar interests (Mustafa *et al.,* 2023). Whether it's learning a new language, taking up painting, or joining a history discussion group, lifelong learning can be both enriching and social. It offers retirees a chance to explore new passions and skills while interacting with peers in a learning environment. This not only helps in maintaining cognitive health but also fosters social connections through shared experiences (Scherger *et al.,* 2011). Learning new things can bring a sense of accomplishment and excitement, contributing to overall life satisfaction. Additionally, the social interactions that come with participating in educational programs or workshops can enhance retirees' sense of community and belonging.

2.4.3.4 Maintaining a Sense of Purpose

Having a sense of purpose is crucial for social satisfaction in retirement. Purpose can come from various sources, such as pursuing personal passions, engaging in meaningful activities, or contributing to the well-being of others. For many retirees, this might involve mentoring, starting a new project, or simply having goals that provide direction and motivation. Maintaining a sense of purpose helps retirees feel that their lives are meaningful and that they are still contributing to society in a positive way (Vo & Phu-Duyen, 2023). This can lead to increased self-esteem and overall happiness. It is important for retirees to identify what brings them joy and fulfillment and to integrate these activities into their daily lives. Whether it's through volunteering, caregiving for family members, or engaging in creative endeavors, having a purpose can significantly enhance social satisfaction (Schwaba & Bleidorn, 2019). It helps retirees feel valued and connected, reducing feelings of emptiness or redundancy that can sometimes accompany retirement.

2.4.3.5 Fostering Intergenerational Relationships

Fostering intergenerational relationships is another vital measure of social satisfaction. Engaging with younger generations can bring a fresh perspective and dynamic interactions that enrich retirees' lives (Sharif & Naghavi, 2020). These relationships might involve spending time with grandchildren, participating in mentorship programs, or simply forming friendships with younger people in the community. Intergenerational interactions can provide retirees with a sense of relevance and continuity, bridging the gap between different age groups. It allows them to share their experiences, wisdom, and life lessons, which can be rewarding and affirming (Gustman & Steinmeier, 2002). These relationships can also offer retirees a window into contemporary culture and issues, keeping them connected and engaged with the world. Additionally, younger generations can benefit from the guidance and support of older adults, creating a mutually enriching experience. Fostering these relationships helps retirees feel connected, valued, and involved, enhancing their overall social satisfaction and well-being.

2.4.4 Lifestyle satisfaction

Lifestyle related satisfaction from retired life can be measured as:

2.4.4.1 Social Engagement

Social engagement is a crucial factor in lifestyle satisfaction during retirement. Maintaining and nurturing relationships with family, friends, and community members fosters a sense of belonging and emotional support (Duflo & Saez, 2003). Active participation in social activities and community events can prevent feelings of isolation and loneliness, which are common among retirees. Social connections provide opportunities for meaningful interactions, shared experiences, and emotional support, all of which contribute to overall well-being. Engaging in group activities, volunteering, or joining clubs and organizations helps retirees stay active, stimulated, and connected with others (Fasang, 2008). Social engagement also provides a platform for retirees to contribute to their communities and feel valued. By building and maintaining strong social networks, retirees can enhance their quality of life, find joy in everyday interactions, and experience a richer, more satisfying retirement.

2.4.4.2 Work-Life Balance

Achieving a balanced work-life dynamic, even in retirement, is essential for lifestyle satisfaction. For retirees, this balance often involves transitioning from a structured work schedule to a more flexible routine (Schellenberg *et al.,* 2005). Maintaining a harmonious balance between leisure, social activities, and personal time allows retirees to enjoy their retirement fully. This balance helps retirees avoid the potential pitfalls of over-scheduling or, conversely, becoming too sedentary. Establishing a daily routine that incorporates a mix of activities—such as exercise, hobbies, socializing, and relaxation—ensures that retirees remain engaged and content (Stebbins, 2000). Additionally, managing time effectively to include periods of rest and recreation contributes to overall well-being. By finding a rhythm that suits their personal preferences and needs, retirees can create a fulfilling and enjoyable retirement experience.

2.4.5 Life Purpose and fulfilment

2.4.5.1 Pursuing Passion Projects and Hobbies

In retirement, finding and dedicating time to passion projects or hobbies can significantly enhance life purpose and fulfillment. For many retirees, this is an opportunity to revisit interests or discover new ones that were previously sidelined due to the demands of a career (Vivel-Búa *et al.,* 2019). Engaging in activities like painting, gardening, writing, or woodworking not only brings joy and a sense of accomplishment but also creates a sense of identity and personal meaning. This pursuit of hobbies often leads retirees to explore and develop skills they were passionate about but didn't have time for during their working years (Stebbins, 2000). Such engagement can provide a continuous sense of achievement and purpose, which is crucial for emotional well-being. Moreover, these activities often involve learning and growth, which are essential for maintaining a vibrant and satisfying life in retirement. By dedicating time to what they love, retirees can create a fulfilling daily routine that nurtures their personal interests and enriches their sense of self.

2.4.5.2 Volunteering and Giving Back

Volunteering is another powerful way retirees can experience life purpose and fulfillment. Contributing time and skills to charitable causes or community organizations allows retirees to make a positive impact on others' lives (Smith, 2004).

This act of giving back can provide a profound sense of satisfaction and meaning. Whether it's mentoring youth, helping at a food bank, or participating in environmental conservation efforts, volunteering aligns with many retirees' desires to contribute to something greater than themselves (Komp *et al.,* 2012). This engagement not only fosters a sense of accomplishment but also helps retirees stay active and involved in their communities. The reciprocal benefits of volunteering—such as the joy of helping others and the gratitude received—can significantly enhance a retiree's sense of purpose. Additionally, these activities often provide opportunities for social interaction and personal growth, further contributing to a fulfilling and purposeful retirement.

2.4.5.3 Setting and Achieving Personal Goals

Setting and achieving personal goals is a critical aspect of life purpose and fulfillment in retirement. Having goals provides direction and motivation, whether they involve health, travel, learning, or personal development (Osborne, 2012). Retirees might set goals like improving physical fitness, traveling to new destinations, or learning a new skill. Achieving these goals gives a sense of accomplishment and reinforces a retiree's sense of purpose. Personal goals often require planning, effort, and perseverance, all of which can contribute to a satisfying and meaningful retirement (Brougham & Walsh, 2005). Moreover, the process of setting and pursuing goals helps retirees remain engaged and focused, providing structure and a sense of progress in their daily lives. This continual pursuit of personal aspirations ensures that retirement is not a period of stagnation but rather one of active growth and fulfillment.

2.4.5.4 Engaging in Lifelong Learning

Lifelong learning is a significant measure of life purpose and fulfillment for retirees. The opportunity to acquire new knowledge or skills can invigorate one's sense of purpose and keep the mind active and engaged. Retirees might take courses in areas of interest, attend workshops, or participate in educational programs offered by local institutions or online platforms (Istance, 2015). Learning new subjects or pursuing academic interests provides intellectual stimulation and a sense of achievement. This continuous quest for knowledge not only enriches retirees' lives but also helps them stay mentally sharp and curious. Engaging in lifelong learning often leads to personal growth and can introduce retirees to new communities of like-minded individuals, further enhancing their sense of connection and fulfillment. By prioritizing education

and personal development, retirees can foster a lifelong sense of purpose and remain engaged in a meaningful way.

2.5 CONSTRUCTS SUMMARY AND IDENTIFIED GAPS

Constructs used in this research work were explored in above sections. Review is summarized and identified gaps and challenges are discussed in this section.

2.5.1 Financial Preparedness

Financial preparedness is considered one of the most critical dimensions of retirement readiness and has been a focal point of retirement planning literature for decades. At its core, financial preparedness refers to an individual's ability to meet both expected and unexpected expenses during retirement without compromising quality of life (Coutaz, 2018). The concept has evolved over time, shifting from simplistic income replacement calculations to more comprehensive indicators that include debt levels, investment behaviour, financial literacy, and lifespan planning (Segel-Karpas & Werner, 2014).

Early research from the 1970s and 1980s, predominantly from the U.S. and U.K., emphasised pension entitlements and employer-sponsored benefits as the primary pillars of financial preparedness. However, with increasing informalization of labour and declining coverage of defined benefit (DB) plans, more recent studies underscore the importance of personal savings behaviours, retirement age decisions, and financial literacy as key determinants of readiness (Nawi et al., 2023).

Retirement Age and Financial Accumulation

Numerous studies demonstrate a positive correlation between delayed retirement and improved financial readiness. For instance, Slavov (2024) and Vettese (2024) suggest that postponing retirement allows for extended saving years and enhances pension payouts due to increased contribution tenure and delayed benefit withdrawal. This conclusion is consistent with earlier findings by Muir and Turner (2003), who argued that late retirees tend to receive a more favourable income trajectory post-retirement due to compound investment gains and bonus benefits. However, longevity risk remains a critical concern, particularly for early retirees who may underestimate life expectancy and thus deplete resources prematurely (De Nardi et al., 2016).

Pre-Retirement Income and Savings Potential

Pre-retirement income is positively associated with financial preparedness, not only because of higher savings potential but also due to better access to professional financial

advice and structured investment instruments (Tamborini & Kim, 2020; Lusardi et al., 2020). Research by Blanchett (2023) recommends targeting a replacement ratio of 70–80% of pre-retirement income to maintain living standards — though this benchmark varies significantly by geography, household type, and healthcare coverage.

Investment behaviour and Long-Term Planning

Long-term investments, including real estate, equities, and inflation-protected bonds, are cited as critical tools for wealth accumulation over time. Parker et al. (2022) and Jeon & Park (2020) highlight the importance of disciplined investing in achieving financial security, although market volatility remains a significant barrier. The literature also suggests that investment literacy and portfolio diversification play pivotal roles in mitigating risks over long horizons (Owadally et al., 2021).

Structured Pension Schemes: DB vs. DC

The shift from Defined Benefit (DB) to Defined Contribution (DC) plans globally has changed the landscape of retirement readiness. Although less flexible, DB plans provide predictable income and reduce individual risk, particularly for retirees who lack financial literacy (Principi et al., 2020). In contrast, DC plans offer greater autonomy but place the burden of decision-making and market exposure on the individual (Brown & Weisbenner, 2009; Bhattacharya & Illanes, 2022). Studies point out that while DC plans offer portability and tax efficiency, they require higher levels of engagement and financial acumen.

Financial preparedness is also shaped by psychological and behavioural traits. Individuals with high conscientiousness, future orientation, and risk aversion tend to exhibit better financial planning outcomes (Hershey & Mowen, 2000; Hill & Pfund, 2022). Financial literacy not only affects the ability to accumulate savings but also reduces susceptibility to fraud and enhances investment decision-making (Collins & Urban, 2016; Ricca & Scozzari, 2024). Future-orientated individuals are more likely to initiate savings early, monitor progress, and maintain a diversified portfolio (Safari et al., 2021).

Identified Gaps and Study Implications

Despite an expanding body of research, significant gaps remain. Much of the current literature is based on formal-sector workers from developed nations. Few studies explore how informal sector participants or retirees in emerging economies like India

navigate financial planning. Additionally, most models examine pre-retirement behaviours but fail to evaluate post-retirement financial adequacy — a gap this thesis aims to bridge by proposing a dynamic post-retirement fund management model. The model will integrate financial variables with preparedness indicators and evolving expectations to provide a more adaptable approach to retirement sustainability.

2.5.2 Health Preparedness

Health preparedness for retirement encompasses an individual's capacity to manage physical, mental, and financial health-related challenges in later life. It ensures that retirees are capable of maintaining a quality life despite age-related health deterioration, increased healthcare needs, or mental health vulnerabilities. While financial readiness allows for preventive and curative medical care, it is equally essential that retirees possess the health literacy and access necessary to act on these options (French & Jones, 2011).

Physical and Mental Well-being

Numerous studies have recognised that declining physical health significantly influences retirement satisfaction and financial vulnerability (De Nardi et al., 2016). Chronic conditions such as diabetes, hypertension, and arthritis become prevalent with age, often requiring consistent management through medication, checkups, or therapy (Miah & Wilcox-Gök, 2007). Healthy lifestyle practices — including physical activity, balanced nutrition, and avoidance of harmful habits — are well-documented contributors to long-term well-being (Ding et al., 2016).

Mental health, meanwhile, is an important factor that determines the emotional resilience of retirees. Butterworth et al. (2006) stress that untreated mental health issues, such as depression and anxiety, can severely impair one's capacity to enjoy retirement. Social isolation, often amplified by retirement, further compounds psychological risk.

Financial Access to Healthcare

The financial dimension of health preparedness remains critical. Individuals with higher incomes and better financial literacy tend to be better positioned to afford quality care, health insurance, and emergency services (McDonald & Donahue, 2000). Medicare and Medicaid programs in developed countries provide a partial solution, yet they do not eliminate out-of-pocket costs or long-term care risks (Phillips & Weir, 2023). In India and similar contexts, the lack of comprehensive state-supported health

schemes puts additional pressure on retirees to self-insure through savings or employer-provided benefits.

Health Literacy and planning.

Health literacy enables individuals to interpret health-related information effectively and make informed decisions. Mustafa et al. (2023) argue that low health literacy correlates with poor treatment adherence, higher hospitalisation rates, and a reduced use of preventive services. Technological adoptions such as telemedicine, health apps, and wearable devices have shown promise in empowering retirees to manage their own care — provided the users possess the digital literacy to use them effectively.

Structural and Social Determinants

Health preparedness is influenced by social and environmental supports. Jenkins et al. (2002) emphasise the role of community programs, such as fitness classes or wellness workshops, in promoting physical activity and reducing isolation. Supportive policy environments — including subsidies for senior healthcare and age-friendly urban planning — improve both access and motivation for healthy living (Van Holle et al., 2014).

Family and carer involvement is another vital dimension. Wang & Shi (2014) highlight the emotional and logistical support family members provide in managing appointments, medication, and chronic conditions. In the absence of family, professional carers and long-term care plans become necessary — both of which demand financial foresight.

Gaps and Research Implications

Although literature emphasises the interplay between health status, healthcare access, and financial security, few studies offer an integrated model that includes *psychological, infrastructural, and behavio*ural components of health preparedness. Additionally, empirical research on health preparedness in lower- and middle-income economies like India remains limited, particularly regarding how informal-sector workers plan for and access healthcare in retirement.

This thesis contributes by embedding health preparedness as a core construct in the dynamic post-retirement fund management model, linking it with financial strategies, personal expectations, and lifestyle preferences. The model aims to provide

actionable pathways for individuals and policymakers to assess and improve retirees' health resilience.

2.5.3 Emotional and Social Preparedness

Emotional and social preparedness are critical yet often underemphasised dimensions of retirement planning. While financial and health-related aspects have been extensively researched, the psychological and relational transitions that accompany retirement remain less explored in a comprehensive manner. Emotional preparedness refers to the cognitive and affective readiness to adjust to a life without a formal employment structure, while social preparedness pertains to one's ability to sustain meaningful relationships and social roles beyond the workplace (Butterworth et al., 2006; Vo & Phu-Duyen, 2023).

Psychological Adjustment and Retirement Age

The timing of retirement influences emotional outcomes. Early retirees may experience increased satisfaction due to better health and autonomy (Etgeton et al., 2023), while others who retire later may report better mental stimulation and prolonged social engagement. However, research by Motegi et al. (2016) suggests that abrupt transitions without preparatory coping mechanisms often lead to stress, especially when retirement is unplanned or involuntary.

The importance of social connectivity.

Loss of daily workplace interactions can result in feelings of isolation, anxiety, or identity loss. Forster and Morris (2012) highlight the role of maintaining social connections — with family, friends, and communities — as a buffer against emotional distress. Active socialisation through clubs, volunteer work, and neighbourhood networks is associated with reduced depression, enhanced self-worth, and greater life satisfaction (Woods et al., 2022). These findings align with longitudinal studies suggesting that social capital contributes to both mental well-being and longevity (Butterworth et al., 2006).

Engaging in Purposeful and Structured activities.

Retirees often struggle to find meaning in the absence of a professional role. Meaningful activities such as volunteering, creative pursuits, and community service promote a belief in practicality and identity continuity (Scherger et al., 2011). These activities provide daily structure and support psychological health, as shown by Genoe

et al. (2022). Asebedo and Seay (2014) further note that participation in collective hobbies improves emotional well-being through increased dopamine release and interpersonal engagement.

Adaptation and Emotional Resilience

Adapting to retirement entails redefining routines, managing financial shifts, and navigating lifestyle changes. Positive adaptation is linked to proactive planning and goal setting (Schwaba & Bleidorn, 2019). Individuals with a structured daily schedule tend to report lower levels of distress and greater emotional control (Janssen et al., 2013). Meanwhile, developing a positive mindset — through gratitude, mindfulness, and therapeutic support — significantly improves retirees' coping ability during the adjustment phase (Vo & Phu-Duyen, 2023).

Building a Support Network

A robust emotional support system comprising family, peers, and community stakeholders is essential to retirement satisfaction. Support networks provide practical assistance, companionship, and psychological assurance, particularly during times of illness or financial uncertainty (Gustman & Steinmeier, 2002; Woods et al., 2022). They also serve as conduits for accessing services, transportation, and caregiving, making them indispensable in facilitating autonomy and emotional stability.

Identified Gaps and Study Implications

Despite evidence highlighting the importance of social and emotional well-being, few retirement models integrate these components alongside financial and health planning. Most frameworks adopt a compartmentalised approach, treating emotional factors as ancillary rather than core components of preparedness. There is also limited research addressing culturally specific coping mechanisms or gender-differentiated emotional trajectories in retirement — especially within the Indian context.

This study aims to bridge these gaps by embedding emotional and social preparedness as foundational constructs within a dynamic post-retirement fund management model. In doing so, it proposes a holistic and adaptable framework that aligns psychological, relational, and financial domains to support sustainable post-retirement outcomes.

2.5.4 Family and Legacy Preparedness

Family and legacy preparedness represents a crucial yet often underdeveloped dimension in retirement planning discourse. It refers to the extent to which individuals

plan for the involvement of family in care decisions, professional support structures, intergenerational obligations, and the orderly transfer of assets and values post-retirement. This aspect of preparedness is particularly salient in collectivist cultures like India, where familial ties play a dominant role in both care provision and emotional security during retirement.

Family Involvement in Retirement Decisions

Empirical literature affirms the critical influence of family in shaping retirees' daily experiences. Family members frequently assist with healthcare management, financial decision-making, and emotional support — especially for retirees facing chronic conditions or mobility limitations (Sharif & Naghavi, 2020). According to Wang & Shi (2014), the presence of engaged and informed family carers leads to improved health outcomes, faster recovery from illness, and better adherence to treatment protocols. However, dependency on family members without prior coordination can also result in carer burnout and intergenerational strain, necessitating proactive communication and role planning.

Role of Professional Carers

Increased longevity and shifting family structures have accelerated demand for professional caregiving. Retirees living independently or away from their children often rely on professional aides for personal care, mobility assistance, and medical tasks (Richardson, 2014). These services reduce pressure on families while offering retirees autonomy and peace of mind. Dentinger & Clarkberg (2002) emphasise that professionally trained carers improve quality of life through structured support, companionship, and early responses to emergencies. Yet, affordability remains a barrier, especially in contexts lacking public support or subsidised care programmes.

Legacy and Estate Planning

Estate planning is an integral part of legacy preparedness. Legal, financial, and emotional planning combine to guarantee the transfer of assets in accordance with the retiree's desires. Tools such as wills, trusts, and healthcare directives protect not only property rights but also personal autonomy in case of cognitive decline or incapacitation (Fasang, 2008; Sørensen, 2013). These documents minimise familial conflict and clarify roles among heirs, promoting intergenerational harmony. In contexts where

estate planning is culturally sensitive or poorly understood, the absence of clear plans may lead to legal disputes or the dilution of wealth.

Intergenerational Support Systems

Support across generations flows both ways. Retirees often provide financial or caregiving support to their children and grandchildren, creating a legacy of reciprocity (Damman & van Duijn, 2017). Conversely, adult children serve as vital sources of daily assistance and emotional companionship. Studies highlight the growing trend of multigenerational households, particularly in Asia and Africa, as a strategy for resource pooling and mutual caregiving (Eibich & Siedler, 2020). These arrangements reduce elder isolation, enhance cultural continuity, and lower living expenses. However, they also demand negotiation around privacy, expectations, and financial dependency.

Cultural and Contextual Considerations

In Indian society, retirement planning is deeply influenced by familial expectations and traditions of filial responsibility. Estate planning may be shaped less by legal rationality and more by customary practices and verbal promises. This makes it imperative for retirees to balance emotional considerations with legal clarity. Moreover, gendered roles in caregiving—where women disproportionately serve as informal carers—call for gender-sensitive policies and training initiatives.

Gaps and Study Implications

Despite its multidimensional importance, family and legacy preparedness remains understudied in mainstream retirement models. Most existing literature either examines caregiving or estate planning in isolation, without linking these dimensions to preparedness frameworks. Moreover, there is scant research from emerging economies where informal support systems dominate over formal insurance or care infrastructure. This thesis aims to integrate family and legacy preparedness into a dynamic fund management model, recognising that sustainable retirement planning must extend beyond finances to encompass relationships, responsibilities, and long-term plans for personal values and assets.

2.5.5 Lifestyle Preferences

Lifestyle preferences represent the personal choices retirees make about how they wish to live post-retirement, including decisions around leisure, housing, social life, daily routine, and cultural or recreational engagement. Academic literature recognises that

alignment between expected and actual lifestyles in retirement significantly influences overall retirement satisfaction and psychological well-being (Celidoni & Rebba, 2017; Kunstler, 2002).

Alignment of Expectations and Reality

A central theme in lifestyle literature is the fit between pre-retirement expectations and post-retirement reality. Individuals who successfully sustain their desired lifestyle report higher levels of fulfilment (Wang & Shi, 2014), while mismatches often stem from inadequate planning or health shocks, leading to dissatisfaction and stress. Financial constraints, limited mobility, or family dependencies may restrict lifestyle options, emphasising the need for early and integrated planning.

Determinants of Lifestyle Preferences

Financial resources are foundational to the freedom of lifestyle choices. Lusardi et al. (2020) highlight that retirees with sufficient savings, pensions, or passive income can access diverse leisure, travel, and wellness options. Conversely, retirees with modest means tend to limit themselves to low-cost activities, impacting overall life satisfaction (Amorim & França, 2020).

Health and physical fitness also play a pivotal role. Individuals in better physical condition are more likely to pursue active and socially engaging lifestyles (Anderson & Mellor, 2008), while chronic illnesses can lead to reduced mobility and social isolation.

Social connections influence both emotional health and participation in meaningful activities. Research shows that retirees with rich social networks have improved emotional well-being and lower incidences of loneliness (Duflo & Saez, 2003; Fasang, 2008). Shared hobbies, group travel, and community events enhance quality of life in retirement.

Personal interests and hobbies provide purpose and intellectual stimulation. Retirement opens up time to re-engage with sidelined passions such as painting, gardening, or music. Engagement in personal projects has been associated with cognitive vitality and emotional satisfaction (Stebbins, 2000; Schellenberg et al., 2005).

Contextual and Environmental Influences

Geographic location greatly affects the retirement experience. Ayalon & Yahav (2019) argue that location influences access to healthcare, safety, climate, and cost of living.

Many retirees prefer age-friendly cities or serene rural environments that support their lifestyle aspirations (Duncombe et al., 2003).

Cultural and community engagement adds richness to retirement life. Participation in cultural activities or volunteerism promotes social identity and mental health (Cottier, 2018; Lam et al., 2018).

Technology and accessibility enable retirees to maintain autonomy and connectivity. Tools such as video calls, telehealth, and online courses empower retirees to stay informed and engaged (Ferreira & dos, 2013; Xie et al., 2012).

Climate preferences and environmental quality are increasingly considered in relocation and daily planning. Retirees seek climates conducive to outdoor activities, wellness, and comfort, often prioritising air quality and scenic environments (Lu, 2020).

Gaps and Study Implications

Despite the robust discussion of lifestyle variables, few studies integrate lifestyle preferences within predictive financial planning models, particularly in emerging markets like India. Furthermore, literature lacks adequate treatment of how retirees dynamically adjust their lifestyle in response to financial or health shocks over time.

This thesis addresses these gaps by incorporating lifestyle preferences as a functional driver within a dynamic post-retirement fund management model. The model proposes that adaptable financial strategies can optimise lifestyle continuity, enhancing long-term retirement satisfaction and well-being.

2.5.6 Knowledge and Skill Enhancement Preferences

As retirees transition into a post-employment phase, their preferences for knowledge and skill enhancement emerge as significant determinants of a meaningful and intellectually active retirement. These preferences reflect an individual's drive for lifelong learning, personal growth, and continued contribution to society. The literature increasingly recognises that the pursuit of knowledge postretirement supports cognitive health, enhances emotional well-being, and fosters a sense of purpose and identity (Genoe et al., 2022; Stebbins, 2000).

1. Personal Interests and Hobbies

Retirement offers individuals the time to revisit passions and explore new areas of interest. Studies indicate that retirees who engage in hobbies like art, writing, or

historical research often pursue formal or informal learning channels to deepen their expertise (Motegi et al., 2016; Vivel-Búa et al., 2019). This self-directed learning serves both as a creative outlet and as a mechanism for self-expression and satisfaction, leading to enhanced emotional resilience and life satisfaction.

2. Technological Proficiency

The ability to navigate digital tools significantly shapes retirees' access to learning resources. While digitally literate individuals may use MOOCs, webinars, or virtual communities for skill enhancement (Xie et al., 2012), others face initial barriers to technology adoption. Nonetheless, structured programmes through community centres and libraries have proven successful in bridging the digital divide, thus expanding educational opportunities and social connectivity (Ferreira & dos Santos, 2013).

3. Health and mobility.

Physical health is a crucial mediator in determining the mode and frequency of learning. Retirees with high mobility often prefer active, group-based learning experiences such as field excursions or interactive workshops. In contrast, individuals managing chronic conditions may gravitate toward less demanding activities like book clubs or online classes (Anderson & Mellor, 2008; Butterworth et al., 2006). Adaptability to health needs ensures inclusivity in lifelong learning initiatives.

4. Social Connections and Community Involvement

Peer networks are important motivators for retirees engaging in knowledge acquisition. Collaborative environments, such as senior clubs or intergenerational mentorship programs, enhance social integration and learning outcomes (Cottier, 2018; Duflo & Saez, 2003). Group learning improves retention and satisfaction and mitigates loneliness by offering shared experiences.

5. Financial Resources

Financial capacity often dictates access to formal education or premium programs. Retirees with disposable incomes may enrol in university programs or international study tours, while those with constrained finances often opt for subsidised or free community offerings (Lusardi et al., 2020). Many universities have responded by launching senior learning discounts or open-access courses to enhance affordability and equity.

6. Cultural Background and Values

Cultural norms significantly influence the value placed on learning in retirement. For example, societies that emphasise intellectual enrichment may encourage retirees to pursue structured education, while others may prioritise community service or craftsmanship (Lam et al., 2018; Stebbins, 2000). Cultural resonance makes learning both meaningful and identity-affirming.

7. Past Professional Experience

Many retirees extend their professional identity by mentoring or consulting in their previous domains. Those from technical or academic backgrounds often seek advanced training or research roles, while others pursue hands-on workshops to refine their skills (Stebbins, 2000; Motegi et al., 2016). Past career experiences serve as both motivators and pathways for skill enhancement.

8. Desire for Personal Growth

Beyond external drivers, the intrinsic desire for self-actualisation motivates retirees to engage in intellectual challenges and new learning endeavours. Whether it's mastering a language, writing a memoir, or pursuing spiritual education, these pursuits contribute to psychological vitality and purpose in later life (Genoe et al., 2022; Woods et al., 2022).

Gaps and Implications

While the literature has identified numerous determinants of knowledge-seeking behaviour postretirement, few models systematically integrate these variables into a predictive or fund management framework. Additionally, there remains a gap in empirical studies from emerging economies like India, where social norms, digital literacy, and financial resources uniquely influence learning trajectories in retirement.

This thesis positions knowledge and skill enhancement not merely as an enrichment pursuit but as a strategic pillar in dynamic post-retirement fund management. Enabling access to educational tools through adaptive budgeting, tech literacy, and policy support can enhance retirees' resilience and engagement in a fast-changing world.

2.5.7 Leisure and Personal Fulfilment Preferences

Leisure and personal fulfilment represent core domains through which retirees derive meaning, identity, and psychological well-being in post-retirement life. Retirement is not merely a cessation of work but a reorientation of time and values, often directed

toward previously deferred aspirations. The literature reveals that preferences for leisure and fulfilment are shaped by a combination of personal interests, cultural norms, health status, and access to resources (Wang & Shi, 2014; Stebbins, 2000).

Hobbies and Personal Interests

A foundational aspect of leisure engagement is the pursuit of hobbies. These activities—ranging from gardening and painting to reading and music—offer intrinsic satisfaction and contribute to cognitive vitality. Research suggests that consistent engagement in personally meaningful activities enhances retirees' self-esteem and promotes psychological resilience (Tomar et al., 2021; Collins & Urban, 2016). Moreover, hobby-based social groups encourage community involvement, mitigating risks of social isolation.

Travel and Exploration

Travel ranks among the most desirable retirement activities, symbolising freedom, renewal, and life enrichment. Blazey (1992) and subsequent studies observe that retirees use travel to pursue cultural experiences, visit family, or seek spiritual rejuvenation. Beyond leisure, travel fosters intellectual stimulation, intergenerational bonding, and exposure to new worldviews, which contribute to personal growth and identity reinforcement.

Volunteering and Community Engagement

Volunteering functions as both a leisure activity and a channel for achieving life purpose. Numerous studies indicate that retirees who participate in community service report higher levels of life satisfaction, reduced depressive symptoms, and a greater sense of social contribution (Cottier, 2018; Duflo & Saez, 2003). Volunteering also facilitates skill application, learning, and identity continuity, making it an essential aspect of productive ageing.

Lifelong Learning

Educational engagement serves as a bridge between leisure and personal development. Whether through university courses, workshops, or informal learning circles, retirees derive cognitive stimulation and emotional gratification from learning (Genoe et al., 2022; Schellenberg et al., 2005). These activities also offer social connectivity, especially in group-based formats.

Health and Wellness Activities

The pursuit of physical and mental wellness is a key fulfilment strategy in later life. Activities like yoga, tai chi, swimming, or even daily walking promote mobility, reduce chronic risk factors, and improve mood (Anderson & Mellor, 2008; Butterworth et al., 2006). Group wellness programmes also foster interpersonal bonds, thus addressing both physical and social dimensions of well-being.

Family and Relationship-Based Fulfilment

Spending quality time with family, particularly grandchildren, is deeply valued by retirees. Such interactions offer emotional anchoring, joy, and a sense of generational legacy. Positive family dynamics also serve as a psychosocial safety net, enhancing retirees' confidence and emotional regulation (Gustman & Steinmeier, 2002).

Creative and Artistic Expression

Engaging in creative pursuits—such as writing, photography, or music—offers avenues for self-expression, therapeutic release, and public recognition. Artistic engagement is shown to improve problem-solving skills, emotional stability, and even neuroplasticity in ageing populations (Woods et al., 2022).

Spiritual and Religious Activities

Spirituality offers many retirees a deep sense of peace, community, and life purpose. Activities such as prayer, meditation, or attending services often serve as frameworks for coping with ageing, grief, and existential questioning. Spiritual communities also enhance social connectedness and contribute to positive psychological functioning (Ayalon, 2016).

Gaps and Study Implications

While literature extensively discusses various domains of leisure and personal fulfilment, integration into dynamic fund planning remains weak. Leisure activities are rarely considered in financial planning models beyond superficial budgeting. Additionally, cultural differences in what constitutes "fulfilling leisure" are underexplored, especially in non-Western contexts.

This study integrates leisure and fulfilment preferences into a dynamic post-retirement fund management model, emphasising that financial adaptability must reflect not only needs but also aspirations. By aligning financial tools with leisure goals, retirees can experience a richer, more resilient retirement.

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2.5.9 Financial Security and stability.

Financial security and stability are universally recognised as the cornerstones of a successful and stress-free retirement. They encompass the ability of retirees to maintain their standard of living, meet healthcare and housing costs, and sustain personal goals without financial strain. Literature suggests that retirees' financial expectations are shaped by numerous interdependent variables, including savings, pensions, inflation, healthcare needs, and income diversity (Lusardi et al., 2020; Blanchett, 2023; Engen et al., 2004).

Savings and Investments

Savings and investments constitute the primary self-funded sources of post-retirement income. A disciplined savings culture, when combined with diversified investment strategies, can buffer against inflationary pressures and longevity risks (Angrisani & Casanova, 2021; Jeon & Park, 2020). The principle of compounding emphasises the advantages of early and consistent saving behaviours. Portfolios that include stocks, mutual funds, and real estate offer risk-adjusted growth but demand financial literacy for optimal performance.

Pensions and Social Security

Pensions—particularly defined benefit (DB) plans—have historically ensured income predictability in retirement. However, global pension reforms have shifted to defined contribution (DC) models, transferring risk to the individual (Munnell et al., 2022). The understanding of vesting schedules and payout options significantly affects retirement planning. Although Social Security systems are universally accessible, their adequacy varies significantly. In systems like India's NPS or U.S. Social Security, benefit timing greatly affects the lifetime payout, demanding strategic decision-making (Scott et al., 2020).

Healthcare Costs

Healthcare costs escalate with age, becoming a major determinant of financial preparedness. Anderson & Mellor (2008) emphasise that chronic conditions,

hospitalisations, and long-term care introduce unpredictable and often substantial costs. Health insurance and long-term care plans, such as Medicare and Medigap in the U.S., or private plans in India, are vital for offsetting these expenses. Preventive care and wellness strategies can reduce dependence on costly treatments, yet coverage gaps remain a concern globally.

2Housing and Living Expenses

Housing is frequently the largest recurring expenditure in retirement. Choices like downsizing, reverse mortgages, or relocating to lower-cost regions are popular strategies to reduce costs. Utility bills, property taxes, and maintenance are fixed overheads that require careful budgeting. Retirees without mortgage burdens are often more resilient to financial shocks, enabling funds to be redirected toward health or leisure needs.

Debt Management

Debt undermines financial autonomy in retirement. High-interest debts, such as credit card balances or personal loans, erode retirement savings and heighten stress. Pre-retirement strategies such as debt restructuring or accelerated repayment plans significantly influence financial stability post-retirement. Managing mortgage debt—through early payoff or refinancing—is particularly important (Engen et al., 2004).

Inflation and Cost of Living Adjustments (COLAs)

Inflation steadily erodes purchasing power, especially for retirees dependent on fixed incomes. Blanchett (2023) argues that underestimating inflation's impact is a common planning error. COLAs, when available, partially address inflation by adjusting benefit payouts. Strategic investment in inflation-hedged instruments such as real estate or Treasury Inflation-Protected Securities (TIPS) provides an additional safeguard.

Income Diversification

A diversified income stream reduces dependency on a single source and cushions against economic volatility. In addition to pensions and Social Security, dividends, interest income, annuities, rental earnings, and part-time work provide supplemental income. This diversity improves financial resilience and enables retirees to meet unexpected expenses or fund leisure and lifestyle aspirations (Lusardi et al., 2020).

Gaps and Implications

While extensive literature highlights the role of financial adequacy in retirement satisfaction, few models account for the dynamic interaction between financial expectations and real-time adjustments in response to economic, personal, or market shifts. Additionally, studies in developing countries often overlook how informal financial behaviours (e.g., gold savings or intergenerational transfers) affect stability.

This research integrates financial expectations into a dynamic fund management model, enabling personalised adjustments to retirement portfolios based on lifestyle changes, inflation rates, and healthcare events—thereby improving long-term sustainability and alignment with retiree goals.

2.5.10 Health and Mental Well-being Expectations

Health and mental well-being are foundational to the retirement experience. As individuals transition into retirement, expectations around physical vitality, healthcare access, mental health management, and supportive environments significantly influence quality of life. Literature suggests that fulfilling these expectations is both a determinant and consequence of retirement satisfaction (Butterworth et al., 2006; Anderson & Mellor, 2008).

Financial Security

Financial well-being is closely tied to physical and mental health outcomes. Retirees with adequate financial resources are better equipped to access medical services, maintain healthy diets, and engage in wellness activities. Conversely, financial insecurity is linked to psychological distress, anxiety, and restricted healthcare access (Sharif & Naghavi, 2020). Studies confirm that stable income sources allow retirees to prioritise preventive care, avoid treatment delays, and reduce chronic disease exacerbations.

Access to Quality Healthcare

Comprehensive access to healthcare—encompassing both physical and mental health services—is vital. Systems like Medicare and Medicaid offer baseline coverage, but many retirees require supplemental plans for adequate support. Early detection of illness, management of chronic diseases, and access to specialists determine health trajectories. The availability of mental health services (e.g., counselling and therapy)

also correlates with better cognitive and emotional health in old age (Anderson & Mellor, 2008).

Social Connections and Support

Social relationships play a buffering role in health management. Studies indicate that retirees with strong social ties have lower risks of depression and cognitive decline (Gustman & Steinmeier, 2002; Sharif & Naghavi, 2020). Community involvement, volunteering, and family engagement foster emotional resilience. Support networks also encourage health-seeking behaviours and adherence to treatments while mitigating loneliness and isolation.

Healthy Lifestyle Choices

Physical activity, nutrition, sleep hygiene, and avoidance of harmful habits are key lifestyle determinants of health in retirement. Regular exercise improves cardiovascular, musculoskeletal, and cognitive health, while balanced diets lower the risk of lifestyle-related diseases. Poor sleep is associated with cognitive impairment and mood disorders. Adopting these habits enhances quality of life and reduces long-term medical costs (Motegi et al., 2016; Vivel-Búa et al., 2019).

Mental Health Awareness and Management

The risk of depression, anxiety, and cognitive decline increases with age. However, stigma surrounding mental health often delays care-seeking behaviour among older adults. Mindfulness, meditation, and regular cognitive stimulation—like reading or problem-solving—improve psychological outcomes. Access to therapy and supportive communities further facilitates coping during the transition from work to retirement (Banhato et al., 2015; Vo & Phu-Duyen, 2023).

Gaps and Implications

Despite rich literature on determinants of health and mental well-being, few retirement planning frameworks integrate health shocks and psychological adjustments as dynamic budgetary parameters. Retirees' shifting healthcare needs—especially with ageing and chronic illness—demand adaptive models that allow flexible fund allocation.

This thesis integrates health-related expectations into a responsive fund management model, where healthcare access, emotional health requirements, and social support

costs are factored into financial forecasting. Doing so enhances retirees' resilience, dignity, and overall well-being.

2.5.11 Social and Family Engagement Expectations

Social and family engagement is central to the well-being of retirees, influencing not only emotional satisfaction but also long-term cognitive and physical health. The literature suggests that strong interpersonal relationships and community involvement significantly enhance life satisfaction in retirement, serving as buffers against loneliness, depression, and social isolation (Jenkins et al., 2002; Woods et al., 2022).

Social Networks and Community Involvement

The transition to retirement often entails a shift in daily social interactions, as individuals move away from work-centric environments. In this context, the strength and structure of retirees' social networks become crucial. Engaging in clubs, volunteer programs, religious groups, and civic associations helps retirees develop new connections and maintain a sense of purpose and belonging. Community involvement is also associated with improved mood, increased life satisfaction, and cognitive stimulation, especially when it involves reciprocal or prosocial engagement (Wang & Shi, 2014).

Family Dynamics and Proximity

Family relationships serve as an emotional anchor in later life. Literature highlights the importance of geographic proximity to family—particularly children and grandchildren—as a predictor of social satisfaction. Frequent family contact fosters emotional bonding, intergenerational exchange, and informal caregiving. However, geographic dispersion or strained family ties may hinder these benefits, leading to social disengagement or emotional distress. Therefore, family structure, relational quality, and physical closeness significantly influence retirees' social expectations and experiences (Gustman & Steinmeier, 2002).

Health and Mobility

Retirees' ability to engage socially often hinges on their physical health and mobility. Chronic illnesses, cognitive decline, or disabilities can restrict participation in social events or travel to meet loved ones. Conversely, those with greater mobility can actively engage in diverse social opportunities, enhancing psychological well-being. Assistive technologies, mobility aids, and telecommunication tools help mitigate physical

constraints, offering alternative ways for social interaction, such as virtual meetups or phone-based companionship (Phillips & Weir, 2023; De Nardi et al., 2016).

Financial Resources

Financial capacity plays a dual role: it enables social engagement and supports family involvement. Retirees with adequate resources are more likely to afford travel, host family gatherings, participate in social clubs, and engage in community services. Those with limited means often face restrictions in fulfilling their social expectations, leading to isolation. In addition, retirees may support their families financially—e.g., contributing to education or caregiving—which also impacts how they allocate funds for personal engagement (Siegel, 2021; Lingyan et al., 2021).

Gaps and Implications

Despite strong evidence linking social connectedness with well-being, few retirement models explicitly incorporate social engagement goals into financial frameworks. Most existing fund management tools prioritise survival needs but overlook emotional, relational, and social aspirations that often define the quality of life after retirement.

This thesis proposes integrating social and family engagement expectations as a budgetary dimension in post-retirement fund modelling. By doing so, retirees can plan not only for living but for *thriving*—investing intentionally in social capital as a contributor to sustained well-being.

2.5.12 Leisure, Relaxation, and Lifestyle Expectations

Leisure and lifestyle form a core domain of retirement expectations, shaping how retirees anticipate spending their time and deriving satisfaction in later life. These expectations often encompass travel, recreation, wellness, hobbies, and the freedom to pursue self-chosen routines. Literature indicates that these domains are influenced by financial, health, social, and personal dimensions (French & Jones, 2011; Gustman & Steinmeier, 2002).

Financial Resources

Financial capacity significantly determines retirees' ability to realise lifestyle aspirations. Individuals with ample savings, pensions, or investment income are more likely to afford travel, fine dining, or expensive hobbies like golf and sailing. Conversely, those with limited financial resources may restrict their expectations to low-cost activities such as walking, reading, or community events. This disparity is a

central factor in retirement satisfaction, which illustrates the importance of robust pre-retirement financial planning and adaptable fund allocation strategies post-retirement (McDonald & Donahue, 2000).

Health and Mobility

Physical health and functional mobility are critical enablers—or constraints—of leisure participation. Retirees in excellent health may expect to engage in active pursuits such as hiking, swimming, or international travel. In contrast, individuals with chronic conditions or limited mobility may prefer quieter activities like indoor games, spiritual practices, or reading groups (Anderson & Mellor, 2008; Vo & Phu-Duyen, 2023). The alignment between physical capability and leisure preference significantly influences both participation and satisfaction.

Social Connections

Leisure is often socially embedded. Those with strong family and peer connections are more likely to anticipate shared experiences such as group tours, community events, or club participation. Individuals who are socially isolated may have fewer leisure expectations or rely more on passive or solitary activities. Research confirms that social support enhances motivation and opportunity for active leisure, thereby improving overall lifestyle satisfaction (Wang & Shi, 2014; Fasang, 2008).

Personal Interests and Hobbies

Retirees often view this phase as an opportunity to rediscover or deepen personal interests. Activities such as painting, cooking, music, writing, or learning a new language are frequently cited. The pursuit of hobbies not only provides structure to daily life but also supports identity, self-worth, and creativity. Moreover, these activities offer therapeutic benefits and may contribute to mental agility and emotional regulation (Collins & Urban, 2016).

Geographic Location and Cultural Factors

Where retirees live also shapes their lifestyle expectations. Those residing in urban or coastal areas often anticipate access to diverse cultural, recreational, and social activities. Others may relocate to retirement communities designed around active lifestyles. Cultural norms also influence expectations; for example, collectivist societies may emphasise family-based leisure, while individualistic cultures may prioritise self-directed activities (Celidoni & Rebba, 2017).

Gaps and Implications

Despite clear evidence linking lifestyle satisfaction to health, wealth, and social engagement, retirement planning models often marginalise leisure preferences as non-essential. However, unmet leisure expectations can diminish psychological well-being and reduce the perceived success of retirement.

This research addresses this gap by incorporating lifestyle expectations as a functional parameter in dynamic post-retirement fund models. It ensures that financial planning tools are not only survival-centric but also designed to accommodate fulfilment and quality of life.

2.5.13 Personal Growth, Fulfilment, and Achievements

Retirement is increasingly seen not merely as a period of rest but as a stage for self-actualisation, lifelong learning, and continued personal development. Contemporary literature underscores the evolving narrative in which retirees aspire to grow intellectually, emotionally, and socially beyond the confines of prior professional identity (Genoe et al., 2022; Ding et al., 2016).

Sense of Purpose

The transition from structured work roles to an open-ended routine can often create a void in retirees' identity and daily meaning. Studies emphasise the importance of establishing a new sense of purpose—whether through creative endeavours, mentoring, volunteering, or entrepreneurship—as a foundation for personal growth in retirement (Brown et al., 2019). Purpose-driven activities are linked with higher satisfaction and better psychological outcomes, providing structure and relevance in daily life. Without it, retirees may experience motivational decline or emotional stagnation.

Health and Vitality

Vitality, energy, and mental sharpness are essential enablers of personal development in later life. Health limitations can restrict engagement in desired pursuits, making proactive health maintenance—via nutrition, physical activity, mental stimulation, and stress management—vital for sustained self-fulfilment. Etgeton et al. (2023) highlight that retirees who manage their physical and mental well-being are more capable of engaging in learning, social involvement, and ambitious personal projects.

Financial Freedom

A solid financial foundation empowers retirees to pursue personal goals without economic strain. Whether enrolling in courses, travelling, or investing in passion projects, financial freedom supports exploration and engagement. On the other hand, economic constraints can inhibit ambition and foster passive, survival-based retirement experiences. As French & Jones (2011) argue, planned financial autonomy enhances personal agency and goal realisation in retirement.

Social and Emotional Connectivity

Social relationships act as scaffolds for growth and achievements. Supportive friends, family, and peer groups encourage goal-setting and celebrate milestones, reinforcing motivation and emotional well-being. Social engagement also offers accountability and feedback, helping retirees stay focused and inspired (Woods et al., 2022; Janssen et al., 2013).

Gaps and Implications

Despite the growing focus on post-retirement personal growth, most retirement planning models overlook non-financial aspirations, such as goal-setting, self-actualization, and life enrichment. The absence of such parameters in financial models renders them incomplete and limits their alignment with modern retirees' aspirations.

This research bridges the gap by integrating personal fulfilment variables into a dynamic post-retirement fund model, ensuring that not just material needs but also aspirational goals—like learning, travel, or social contribution—are planned for financially.

2.5.14 Financial Satisfaction

Financial satisfaction refers to the subjective evaluation of an individual's financial situation during retirement, encompassing both the adequacy of income and the retiree's sense of control over financial decisions and security. Unlike financial preparedness—which centres on pre-retirement savings and planning—financial satisfaction focuses on the perceived sufficiency, autonomy, and peace of mind derived from financial resources in post-retirement life (Joo & Grable, 2004; Brüggen et al., 2017).

Determinants of Financial Satisfaction

Several empirical studies highlight that financial satisfaction is not solely determined by income or wealth but by a combination of objective and psychological factors. Lusardi et al. (2020) found that perceived income adequacy, financial literacy, and the ability to manage expenses are significantly associated with financial well-being in later life. Additionally, Letkiewicz and Fox (2014) identified a strong correlation between perceived control over financial decisions and financial satisfaction, particularly among retirees who actively manage their savings, debt, and discretionary spending.

Tamborini and Kim (2020) argue that financial satisfaction tends to improve when retirees possess diversified income streams—such as pensions, annuities, or rental income—rather than relying solely on a single savings source. Blanchett (2023) further recommends maintaining an income replacement rate of 70–80% of pre-retirement income to ensure both material sufficiency and subjective satisfaction.

Financial Satisfaction and Retirement Quality

Financial satisfaction is strongly associated with overall retirement satisfaction. Retirees who report being satisfied with their finances also tend to experience better health outcomes, greater autonomy, and higher psychological resilience (Kim & Moen, 2002; Wang & Shi, 2014). Moreover, individuals who perceive themselves as financially stable are more likely to participate in meaningful activities such as travel, learning, or community involvement—factors that reinforce life satisfaction.

Studies also reveal that financial dissatisfaction often stems from unanticipated post-retirement expenses, such as healthcare costs, inflation erosion, or market downturns, which were either underestimated or not planned for adequately (French & Jones, 2011; Anderson & Mellor, 2008). This demonstrates the importance of adaptive financial strategies that are responsive to post-retirement realities rather than rigid static plans.

Influence of Demographic and Psychological Factors

Gender, education, cultural background, and personality traits also shape financial satisfaction. Women, particularly those who have taken career breaks or worked in informal sectors, often report lower financial satisfaction due to limited access to pensions and structured savings (Sharif & Naghavi, 2020). Furthermore, future-orientated individuals with higher financial literacy tend to be more confident and satisfied in managing retirement finances (Hershey & Mowen, 2000).

Gaps and Theoretical Implications

Despite its central role, financial satisfactionmains under-represented in traditional retirement fund models, which predominantly rely on deterministic, wealth-based indicators. Existing models fail to capture the emotional and psychological dimensions of financial sufficiency, which can influence risk-taking behaviours, lifestyle decisions, and well-being in retirement.

This thesis addresses this shortfall by incorporating financial satisfaction as a dynamic feedback mechanism within the proposed post-retirement fund management model. This approach allows for the adjustment of fund allocation strategies based on subjective experiences, helping retirees better align their financial decisions with real-time well-being outcomes.

2.5.15 Life Satisfaction Indexes

Life satisfaction in retirement is a multidimensional construct that evaluates retirees' holistic contentment with their post-employment life. To measure this subjective dimension rigorously, researchers have developed several standardised life satisfaction indices that capture cognitive evaluations of life quality, meaning, and personal achievement.

Theoretical Foundation

Life satisfaction is typically defined as the cognitive-judgemental component of subjective well-being, where individuals reflectively assess their lives against personal values and aspirations (Diener et al., 1985). This assessment becomes particularly relevant in retirement, a phase marked by identity shifts, role transitions, and altered daily structure. The use of life satisfaction indexes allows scholars and practitioners to quantify this subjective evaluation for academic research, policy development, and retirement planning.

Prominent Tools

Among the most widely used life satisfaction scales in retirement research are:

- **Satisfaction With Life Scale (SWLS)**: Developed by Diener et al. (1985), the SWLS is a five-item scale that measures global life satisfaction. It has been validated across diverse cultural and demographic groups and is widely used in retirement studies for its reliability and simplicity.

- **Life Satisfaction Index-A (LSIA)**: One of the earliest tools tailored specifically to older adults, the LSIA assesses five components of satisfaction: zest vs. apathy, resolution and fortitude, congruence between desired and achieved goals, self-concept, and mood tone (Neugarten et al., 1961). It is particularly useful for evaluating psychosocial adaptation to retirement.
- **Retirement Satisfaction Inventory (RSI)**: This tool focuses on domain-specific satisfaction, such as satisfaction with health, finances, relationships, time use, and overall retirement experience. It provides a more nuanced picture of satisfaction than global scales alone.

Application in Retirement Studies

Empirical research demonstrates that life satisfaction scores correlate strongly with other retirement satisfaction indicators such as financial security, health, autonomy, and social connectedness (Kim & Moen, 2002; Wang & Shi, 2014). These indexes help identify risk groups—such as widowed, low-income, or chronically ill retirees—who may experience below-average life satisfaction despite structural adequacy.

Moreover, longitudinal studies using these tools show that life satisfaction fluctuates across retirement phases, typically rising shortly after retirement, dipping during health deterioration, and stabilising with psychological adjustment (Hershey & Mowen, 2000).

Strengths and Limitations

Life satisfaction indexes are valued for their standardisation, comparability, and diagnostic utility, but critics argue they may oversimplify complex emotional experiences or fail to capture cultural variations in ageing and retirement norms (Sharif & Naghavi, 2020). Furthermore, self-report biases and social desirability effects can distort responses if instruments are not carefully administered.

Gaps and Relevance to Dynamic Fund Modelling

Although these indexes offer crucial understanding of retirees' psychological and emotional conditions, financial decision-making frameworks rarely incorporate them. Most post-retirement fund models neglect life satisfaction feedback, leading to static, resource-based planning.

This study proposes incorporating life satisfaction scores into a dynamic post-retirement fund management model. By doing so, fund reallocation and expenditure

planning can be better aligned with retirees' changing emotional and cognitive assessments—enhancing both financial utility and psychological well-being.

2.5.16 Social Satisfaction

Social satisfaction in retirement refers to the subjective evaluation of one's social relationships, community involvement, and overall sense of belonging during the post-employment phase. It is a multidimensional construct encompassing social connectedness, frequency and quality of interactions, and fulfilment derived from roles in family and community settings. A strong body of research highlights the positive impact of social integration on psychological well-being and life satisfaction in older adults (Jenkins et al., 2002; Van Holle et al., 2014).

Maintaining Social Connections

Maintaining social connections is a fundamental determinant of retirement satisfaction. The transition away from the workplace often results in diminished day-to-day interactions, making proactive relationship maintenance vital. Retirees who actively invest in family ties, friendships, and new social networks tend to report higher emotional well-being and reduced levels of loneliness and depression (Van Holle et al., 2014). This is particularly important for solo retirees or those living away from immediate family.

Engaging in Community Activities

Participation in community-based activities—including volunteering, cultural events, and club memberships—enhances social satisfaction by creating an environment that promotes meaning and mutual belonging. Community involvement offers avenues for retirees to contribute meaningfully to society and sustain a structured social routine. Research suggests that such engagements are positively linked with lower mortality risk and improved cognitive functioning in older age (Butterworth et al., 2006; Jenkins et al., 2002).

Participating in Lifelong Learning

Lifelong learning—whether through formal education or informal group-based programsserves as a dual tool for cognitive stimulation and social interaction. Educational engagement facilitates interaction with peers sharing similar interests, expanding one's social circle while providing intellectual gratification (Scherger et al.,

2011; Mustafa et al., 2023). These environments promote both mental agility and emotional fulfilment in retirees.

Maintaining a Sense of Purpose

Purpose-orientated activities—such as caregiving, mentoring, or pursuing personal passions—are integral to social well-being. Retirees who maintain a strong sense of purpose experience elevated self-worth and identity continuity, which enhances their emotional health. This sense of relevance often stems from contributing to others, aligning with theories of generativity in later life (Vo & Phu-Duyen, 2023; Schwaba & Bleidorn, 2019).

Fostering Intergenerational Relationships

Interactions with younger generations—through familial roles, community outreach, or mentorship programs—enhance retirees' perceptions of their social utility and cultural relevance. These intergenerational bonds contribute to reduced age-related stereotyping, mutual respect, and the passing on of values, all of which boost social satisfaction (Gustman & Steinmeier, 2002; Sharif & Naghavi, 2020).

Implications and Gaps

Despite its critical role, social satisfaction is rarely embedded into financial models or fund management systems for retirees. Many dynamic frameworks prioritise physical and financial parameters while ignoring social well-being, which can significantly influence retirees' decisions and overall satisfaction.

This thesis argues for the integration of **social satisfaction indicators** into dynamic post-retirement fund models. By incorporating real-time feedback on social well-being, retirees can optimise not only resource allocation but also the overall richness of their post-retirement lives.

2.5.17 Lifestyle Satisfaction

Lifestyle satisfaction refers to the degree of contentment retirees experience from their daily routines, freedom of time use, leisure engagements, and alignment with personal interests. It goes beyond material resources and encapsulates how well retirees are able to live according to their values, preferences, and health capacities (Celidoni & Rebba, 2017). As retirement represents a significant shift in time structure and identity, lifestyle satisfaction plays a critical role in holistic retirement well-being.

Social Engagement

Social engagement is a vital determinant of lifestyle satisfaction in retirement. Regular interactions with family, friends, and community members help maintain emotional balance and reduce the risk of loneliness. Activities such as volunteering, club participation, and event involvement offer retirees a sense of connection, purpose, and shared meaning (Duflo & Saez, 2003; Fasang, 2008). These social outlets contribute not only to emotional well-being but also to physical health through increased activity levels and cognitive stimulation.

Work-Life Balance in Retirement

Although retirement implies freedom from employment, balancing leisure, social time, and rest remains essential. A well-paced routine combining structured activities with personal downtime prevents over-scheduling or disengagement. According to Schellenberg et al. (2005), retirees who maintain a balanced rhythm of exercise, hobbies, relaxation, and social activities report higher levels of lifestyle satisfaction. Flexibility, autonomy, and self-determined schedules enable retirees to shape a fulfilling daily routine that aligns with their energy levels, priorities, and personal growth goals.

Interlinkages and Implications

Lifestyle satisfaction is inherently linked to other satisfaction domains such as financial, social, and health well-being. For instance, financial security enables travel, wellness activities, and recreational spending; excellent health allows for active leisure and mobility; and strong social connections encourage participation and exploration.

Despite this interdependence, lifestyle satisfaction is seldom modelled as a decision-making driver in frameworks for allocating retirement funds. Existing systems often emphasise income replacement rates or actuarial forecasts, disregarding retirees' lifestyle aspirations and behavioural preferences.

This thesis proposes a dynamic post-retirement fund management model that incorporates lifestyle satisfaction metrics—such as preferred time-use patterns, leisure activities, and daily structure—as inputs for more personalised and responsive financial planning. By integrating lifestyle goals into fund management logic, retirees can better align financial decisions with the realities and rhythms of their day-to-day living.

2.5.18 Life Purpose and Fulfilment

A central psychological dimension of retirement well-being is the **sense of purpose and fulfilment**, which encompasses meaningful engagement, achievement of personal goals, and sustained identity beyond the workforce. Unlike material indicators, life purpose reflects a retiree's ability to live intentionally, drawing satisfaction from values-driven activities, relationships, and contributions to society.

Pursuing Passion Projects and Hobbies

Pursuing passion projects and hobbies during retirement is a prominent avenue through which individuals experience self-actualisation and emotional satisfaction. This phase often provides the time and flexibility to engage in long-deferred interests such as art, music, gardening, or writing—activities that stimulate the mind and instill a sense of achievement and personal identity (Vivel-Búa et al., 2019; Stebbins, 2000). These creative and intellectual pursuits contribute not only to cognitive vitality but also to emotional resilience, especially during identity transitions in early retirement.

Volunteering and Giving Back

Volunteering is another powerful contributor to life purpose. It allows retirees to remain socially relevant and contribute to community well-being while reinforcing their sense of usefulness. Roles such as mentoring, environmental conservation, caregiving, and community leadership have been found to elevate purpose and psychological health (Smith, 2004; Komp et al., 2012). Giving back provides intrinsic rewards, creating a virtuous cycle between altruistic behaviour and life satisfaction.

Setting and Achieving Personal Goals

Setting and achieving personal goals supports retirees in maintaining direction and motivation. Whether it is committing to travel goals, pursuing educational milestones, or maintaining physical health targets, goal pursuit structures retirees' time and allows them to feel successful (Osborne, 2012; Brougham & Walsh, 2005). Longitudinal studies reveal that individuals with clearly defined post-retirement goals are less susceptible to depression, boredom, and cognitive decline.

Engaging in Lifelong Learning

Engagement in lifelong learning promotes both cognitive engagement and identity expansion. Participation in workshops, courses, or intellectual communities offers not only knowledge enhancement but also opportunities for social interaction and

emotional stimulation (Scherger et al., 2011; Mustafa et al., 2023). Learning new skills or deepening existing knowledge empowers retirees to adapt to changing societal and technological landscapes, reinforcing relevance and agency in later life.

Gaps and Theoretical Contributions

Despite widespread recognition of purpose as a psychological need, existing retirement models rarely incorporate it into financial planning or fund management strategies. This oversight neglects the reality that retirees often adjust spending patterns to enable purpose-driven pursuits such as philanthropy, travel, or education. Therefore, we cannot fully understand or optimise financial decisions in retirement without considering this motivator.

This thesis advocates for the integration of purpose fulfillment metrics into dynamic post-retirement fund allocation models. By allowing retirees to align financial flows with purpose-driven activities, the model addresses both emotional sustainability and long-term life satisfaction.

2.5.19 Health and Physical Well-being

Health and physical well-being constitute essential components of post-retirement satisfaction, influencing autonomy, lifestyle quality, and financial needs. A robust health profile enables retirees to pursue fulfilling activities and maintain independence, while poor health is often associated with restricted mobility, increased healthcare costs, and emotional distress (Ding et al., 2016; Miah & Wilcox-Gök, 2007).

Current State of Health

The most fundamental determinant of physical well-being is the retiree's existing health status. This includes chronic conditions, disabilities, and limitations in Activities of Daily Living (ADLs)—such as bathing, dressing, and mobility—which directly influence independence and life satisfaction. According to Ding et al. (2016), retirees with fewer ADL limitations report significantly higher well-being and social participation rates.

Access to Healthcare

Access to high-quality healthcare—comprising general care, specialist consultations, and medication—plays a critical role in maintaining physical well-being. Retirees with comprehensive insurance coverage or access to public health programs such as Medicare are more likely to receive preventive and timely care, leading to better long-

term outcomes (De Nardi et al., 2016). Furthermore, mental health services are integral to physical wellness, as unresolved emotional stress can compound physical ailments.

Preventive Care and Pain Management

Preventive healthcare practices, including regular screenings, immunisations, and lifestyle risk management, are associated with prolonged independence and reduced medical costs. Effective pain management—particularly for retirees living with arthritis, musculoskeletal disorders, or injury recovery—improves daily function and quality of life (Miah & Wilcox-Gök, 2007). A preventive approach lowers long-term care dependency and supports healthier ageing trajectories.

Nutrition and Sleep

A well-balanced, nutrient-rich diet is critical for immune function, cardiovascular health, and energy regulation in retirement. Poor dietary habits are linked to metabolic syndrome, fatigue, and weakened physical resilience. Similarly, adequate and restful sleep is vital; persistent sleep disturbances are correlated with cognitive decline and elevated morbidity (Vivel-Búa et al., 2019).

Physical Activity and Fitness

Regular physical activity—such as walking, yoga, or strength training—has been consistently associated with enhanced cardiovascular function, muscular strength, and psychological well-being. Exercise stimulates endorphin release, reduces depressive symptoms, and preserves mobility (Ding et al., 2016). Moreover, fitness routines often promote social interaction, further contributing to life satisfaction.

Implications for Retirement Models

Despite the centrality of health in retirement, traditional fund management models often treat it as an external variable, focusing instead on financial thresholds. This leads to potential mismatches between financial readiness and actual health-adjusted lifestyle requirements.

This thesis proposes a dynamic model that incorporates physical health indicators into fund management logic, allowing for flexible allocations based on real-time health status. For example, higher out-of-pocket medical needs or the need for assistive services should trigger adaptive investment or withdrawal strategies—ensuring that retirees can maintain dignity, independence, and quality of life across varying health scenarios.

2.5.20 Mental and Emotional Well-being

Mental and emotional well-being represents a cornerstone of holistic retirement satisfaction. Retirement often triggers a profound psychological shift—away from structured work life to a more fluid, often isolated, lifestyle. The ability to manage this transition significantly influences retirees' resilience, happiness, and overall quality of life (Banhato et al., 2015; Anderson & Mellor, 2008).

Mental Health Awareness and Management

Awareness and proactive management of mental health are vital to successful ageing. Mental health concerns such as **depression**, **anxiety**, and **cognitive decline** are prevalent among retirees, particularly those facing illness, bereavement, or social isolation. Despite their frequency, these conditions often go undiagnosed and untreated due to stigma or limited access to care. Research shows that regular mental health check-ups, psychotherapy, and mindfulness practices (e.g., meditation, yoga) significantly reduce emotional distress and foster psychological resilience in retirees (Vo & Phu-Duyen, 2023; Butterworth et al., 2006).

Cognitive Stimulation

Mentally stimulating activities such as puzzles, reading, online learning, and creative writing promote cognitive agility and slow age-related decline. These pursuits activate neural pathways, reduce risks of dementia, and support emotional stability by encouraging a sense of achievement and intellectual engagement. Studies confirm that retirees who engage in lifelong learning and mentally challenging hobbies exhibit higher levels of optimism and psychological well-being (Mustafa et al., 2023; Anderson & Mellor, 2008).

Social and Family Support

Strong social networks play a buffering role against emotional distress. Family proximity, friendships, and community engagement help mitigate feelings of isolation—a significant risk factor for mental health deterioration. Retirees with a robust support system are more likely to maintain a positive mindset and recover from emotional setbacks (Sharif & Naghavi, 2020; Woods et al., 2022). Community-based interventions, such as group counselling or senior clubs, further strengthen psychological wellness by reinforcing belonging and self-worth.

Building Positive Outlook and Purpose

Developing a positive mindset and embracing retirement as a phase of new possibilities is central to emotional well-being. Psychological studies highlight that retirees who set realistic goals, practice gratitude, and approach life transitions with optimism experience better emotional outcomes (Schwaba & Bleidorn, 2019). A sense of purpose—derived from caregiving, volunteering, or creative pursuits—anchors mental health by giving structure and meaning to daily life.

Implications for Retirement Fund Planning

Despite growing awareness, most post-retirement fund models are financially reactive rather than emotionally adaptive. They often overlook how psychological well-being affects spending behaviours, care decisions, and risk tolerance. For example, anxiety over finances may lead to hoarding, while emotional instability may increase impulsive withdrawals.

This thesis proposes a model that integrates emotional well-being markers into dynamic retirement fund management. By embedding psychological assessments and mental health flags into fund algorithms, financial plans can become more responsive to retirees' lived experiences—thus achieving both fiscal and emotional sustainability.

2.6 TOOLS AND APPROACHES ADOPTED FOR RETIREMENT SATISFACTION MEASUREMENT

The measurement of retirement satisfaction is a highly subjective endeavour that is contingent upon an individual's self-assessment. Researchers employ many tools and methodologies to assess the aforementioned phenomenon. Several approaches can be identified, including:

2.6.1 Surveys and Questionnaires:

Researchers and organisations commonly employ surveys and questionnaires as tools to assess levels of retirement satisfaction. These surveys commonly consist of a set of inquiries that seniors can answer using a scale, ranging from "very satisfied" to "very dissatisfied." The purpose is to evaluate their general happiness with retirement, as well as particular dimensions such as financial stability, health, social connections, and leisure activities.

2.6.2 Scales for Assessing Life Satisfaction:

Retirement satisfaction may be quantified by utilising existing measures and assessments such as the Life Satisfaction Index A (LSIA) or the Satisfaction With Life Scale (SWLS). Individuals are commonly requested to assess their overall life satisfaction, including their retirement experience, utilising these metrics.

2.6.3 The Role of Interviews in Qualitative Research:

Methods such as in-depth interviews and focus groups have the potential to provide valuable insights on the experiences and levels of satisfaction among retirees. Open-ended questions allow retirees the opportunity to express their perspectives, beliefs, and concerns without restriction.

2.6.4 Self-Evaluation:

Retirees possess the capacity to gauge their own levels of retirement satisfaction via introspection and contemplation of their personal experiences and emotional states. Individuals have the ability to assess their level of satisfaction over a period of time through the practise of record-keeping or by participating in introspective contemplation.

2.6.5 The Retirement Transition Index (RTI):

The Retirement Transition Index (RTI) is a measurement tool used to assess the process of transitioning into retirement. A number of scholars have devised several indices for measuring retirement satisfaction, taking into account many factors like financial stability, physical well-being, social connections, and engagement. These indices produce a composite score that is utilised to ascertain the overall level of contentment with retirement.

2.6.6 The Impact of Social and Psychological Factors on Well-being:

Indicators of retirement satisfaction may be inferred from the examination of social and psychological well-being elements, including emotions of isolation, melancholy, and levels of stress. The evaluation of these factors might provide insights into the overall satisfaction of an individual who has retired.

2.6.7 Comparative Analysis and Attainment of Objectives:

Retirees may assess their level of satisfaction by evaluating the extent to which their retirement circumstances align with their pre-retirement goals and objectives. If

individuals have achieved or exceeded their predetermined goals, they are likely to have a higher level of satisfaction.

2.6.8 Longitudinal Studies:

Longitudinal studies that track individuals' levels of satisfaction throughout retirement over an extended period of time may yield valuable insights on the evolution and transformation of retirement experiences with advancing age.

2.7 EVOLUTION OF "DYNAMIC RETIREMENT PLANNING" MODEL

As the markets are volatile, plans with fixed withdrawal rate plans are preferred. These plans have very high probability of not losing all money. These can help in designing portfolios with average values (Ameriks, Veres & Warshawsky, 2001; Pye, 2001). Indirectly, these average portfolios are reducing the risk of Ruin. Thus dynamic model is bound to increase value of the portfolio by reducing probability of ruin.

First part of review of literature captures the evolution of "dynamic retirement planning" model. Following papers show how dynamic model was proposed for first time and how research gaps were incorporated in following researches:

2.7.1 Three-phase post retirement life model (Bengen W.P., 2001)

Studies suggested that post retirement life can be divided into three phases. Withdrawals can be randomly gradually decreasing if inflation is not considered. Withdrawals can randomly increase in bull market and can randomly decrease in bear market with an upper and lower cap for the change.

In the **early phase of retirement**, often referred to as the "go-go" years, retirees are typically in good health, energetic, and eager to pursue activities and hobbies they may have deferred during their working years. This period is marked by an active lifestyle, including travel, socializing, and perhaps even part-time work or volunteering. Financially, this phase may require substantial expenditure to support a more dynamic lifestyle, but it also provides an opportunity to enjoy the fruits of one's labor and savings.

Transitioning into the **middle phase of retirement**, or the "slow-go" years, individuals often begin to experience a gradual decline in physical and perhaps cognitive abilities. Activities may become less physically demanding, and there is often a shift towards

more home-based or community-centered engagements. Financial needs during this phase may begin to change, with increased focus on healthcare costs and maintaining a comfortable, stable living environment. This stage requires careful financial planning to ensure that resources are allocated efficiently to cover rising medical expenses and to sustain the quality of life.

The **late phase of retirement**, known as the "no-go" years, is characterized by a more pronounced decline in health and mobility. During this stage, retirees might require significant assistance with daily activities and potentially long-term care. The focus shifts to ensuring adequate healthcare and support systems, which can be financially burdensome. This phase highlights the importance of having robust financial strategies, including health insurance and long-term care insurance, to manage the high costs associated with aging and healthcare.

The Three-Phase Post-Retirement Life Model emphasizes the importance of flexible and comprehensive financial planning to accommodate the varying needs and lifestyles throughout retirement. It underscores that retirement is not a monolithic phase but a dynamic process requiring different strategies and resources at each stage. By understanding and preparing for these distinct phases, individuals can better ensure a secure and fulfilling retirement. This model also highlights the value of early and continuous financial planning, health maintenance, and adaptive living arrangements to address the evolving challenges and opportunities presented in each phase of post-retirement life.

2.7.2 Model with withdrawal based on amortized current portfolio value (Pye, 2001)

Author used a technique where retiree can withdraw an amount lower than the previous withdrawal amount (in real terms). For this technique length of the plan and the returns expected from the portfolio are considered. Author took a mean of hypothetical real rate of return and a hypothetical SD (standard deviation). He found out that about 17% of the retirees have to reduce withdrawal.

At its core, this model involves calculating annual withdrawals from a retirement portfolio by amortizing the current portfolio value over the expected remaining lifespan

of the retiree. The calculation considers the current value of the portfolio, anticipated investment returns, and the retiree's remaining life expectancy. Essentially, this method divides the portfolio value by the present value of an annuity, which is adjusted each year based on the portfolio's performance and updated life expectancy estimates.

This approach offers several advantages over traditional fixed-percentage withdrawal methods. First, it provides a more dynamic and responsive strategy that adapts to changes in the portfolio value, reducing the risk of depleting funds prematurely. For instance, in years when the portfolio performs well, the amortized withdrawal amount might increase, allowing for higher income. Conversely, in years with poor performance, the withdrawal amount decreases, thus preserving the capital and enhancing the likelihood of sustaining the portfolio over a longer period.

Moreover, the model incorporates a degree of flexibility and personalization. It can be tailored to individual circumstances, such as varying risk tolerance levels and different expected rates of return. By continually adjusting withdrawals based on the portfolio's current value and expected future performance, retirees can better manage their financial needs and longevity risk.

However, this model also presents challenges. Accurate estimation of life expectancy and investment returns is crucial, as miscalculations can significantly impact the sustainability of withdrawals. Additionally, it requires regular monitoring and recalibration, which can be complex and may necessitate professional financial advice.

2.7.3 Systematic withdrawal model (SWM) (Guyton, 2004)

Author tried to identify a safe withdrawal rate which can avoid ruin. Author suggested certain rules or restrictions on increasing the rate of withdrawal. He also suggested make-ups for the withdrawals exceeded in previous periods. Author assumed that retirees want to maintain the overall withdrawal rates even after incurring losses in Investment and retirees like to keep a limit on the maximum withdrawal. In this paper safe withdrawal rates were defined with following guidelines:

- Withdrawals never reduced over a period
- To offset inflation, systematic withdrawals
- Expecting returns from portfolio for 40 years

Paper also tried to include effect of inflation. Paper studied multiple equity categories. These categories were used to design portfolios with 65% and 80% equity. Decision rules like “sources of annual income withdrawals, impact of years with investment losses and withdrawal increases to offset ongoing inflation” were used.

One of the primary advantages of the SWM is its flexibility. Retirees can adjust their withdrawal rates based on changing financial needs, market conditions, and life circumstances. For instance, in years when the portfolio performs well, retirees might withdraw more, whereas in leaner years, they might opt for smaller withdrawals to preserve the portfolio's longevity. This adaptability makes the SWM particularly appealing for individuals who seek to balance the dual objectives of income generation and capital preservation.

A commonly recommended approach within the SWM framework is the "4% rule," which suggests that retirees withdraw 4% of their initial retirement portfolio value, adjusted annually for inflation. This guideline, developed by financial planner William Bengen in the 1990s, is based on historical market data and aims to ensure that the portfolio lasts for at least 30 years. However, it is important to note that the 4% rule is not a one-size-fits-all solution. Variations in individual circumstances, such as life expectancy, investment horizon, and risk tolerance, necessitate personalized adjustments to the withdrawal rate.

Moreover, the SWM underscores the importance of a well-diversified portfolio. By spreading investments across different asset classes, retirees can mitigate the impact of market volatility on their income streams. Regular portfolio reviews and rebalancing are crucial to maintain the desired asset allocation and to ensure the portfolio continues to align with the retiree's financial goals and risk profile.

2.7.4 Dynamic retirement withdrawal planning Model (Stout R.G. and Mitchell J.B., 2006)

This model was designed on:

- Adjustment of withdrawal rates based on the performance of portfolio and remaining life expectancy
- Returns on investment and mortality simulated using Monte-Carlo Simulation

This research examines six possible withdrawal controls viz. “maximum and minimum withdrawal rates, rates of upward and downward adjustment, and upward and downward thresholds of deviation (adjustment triggers).”

Conclusions drawn from this research were:

- Including mortality reduces probability of Ruin by 50%
- Dynamic withdrawal reduces ruin by 35-40% when compared to fixed withdrawal model
- Dynamic withdrawal model increases average lifetime withdrawal rates by 50%

One of the key features of the dynamic model is its responsiveness to investment performance. For instance, during periods of strong market returns, the model might allow for higher withdrawals, thereby enabling retirees to enjoy more of their accumulated wealth. Conversely, during economic downturns, the model may suggest reducing withdrawals to preserve the portfolio's longevity. This adaptability helps mitigate the risk of depleting retirement savings prematurely, a significant concern with fixed withdrawal rates.

Additionally, the dynamic model considers changes in personal circumstances, such as health status, lifestyle preferences, and unexpected expenses. As retirees age, their spending patterns often shift, with potential increases in healthcare costs or decreases in discretionary spending. The dynamic model can adjust to these changes, ensuring that withdrawals align more closely with actual financial needs and priorities. By incorporating regular reassessments, the model maintains a balance between current consumption and future financial security.

The dynamic model also integrates inflation adjustments to maintain the purchasing power of retirement withdrawals. Traditional fixed models may fail to account for the erosive effects of inflation adequately, leading to a decline in the real value of withdrawals over time. In contrast, the dynamic approach continuously recalibrates the withdrawal amounts to ensure they reflect the current cost of living, thereby safeguarding the retiree’s standard of living.

2.7.5 Rate of return adjustment model (Frank *et al.*, 2011)

It is a three-dimensional distribution model that recognizes the transition from early retirement into later retirement. It used adjustment rules that depend on how much the rate of return deviates from the historical averages. Past research suggested models

based on fixed and safe withdrawal rates or the withdrawal rates governed by certain rules. If retiree focusses on maximization of withdrawal, he/she can eventually be exposed to sequence risk.

Author proposed a 3-d model where four variables (time, Withdrawal % , allocated portfolio and failure probability) can be plotted.

Conclusions drawn from this research were:

- Depending on probability of failure, range of withdrawal rates can be identified.
- Change in portfolio value can significantly affect probability of failure
- Instead of optimum solution, upper limit with acceptable probability of failure was suggested.
- Instead of changing allocations in portfolio, withdrawal amount can be changed effectively.

Central to this model is the concept of adjusting retirement savings and withdrawal strategies based on actual and expected future returns. For instance, during periods of higher-than-expected returns, individuals might increase their savings rate or reduce their retirement contributions, taking advantage of the favourable market conditions to bolster their retirement corpus. Conversely, during periods of lower-than-expected returns, individuals might need to adjust their retirement plans by either increasing their savings rate, delaying retirement, or reducing their expected retirement withdrawals to ensure their funds last throughout their retirement years.

The Rate of Return Adjustment Model also emphasizes the importance of periodic review and adjustment of retirement plans. This dynamic approach allows individuals to respond to changing market conditions and personal circumstances, such as changes in income, health, or family needs. Financial advisors often use Monte Carlo simulations within this model to project a range of possible outcomes based on different return scenarios. These simulations help to illustrate the potential variability in retirement outcomes and guide individuals in making informed decisions about their retirement strategies.

Furthermore, this model underscores the value of diversification in an investment portfolio. By spreading investments across a variety of asset classes, individuals can mitigate the risks associated with any single investment's poor performance, thereby

smoothing out the overall rate of return. This diversified approach can help in achieving a more stable and predictable growth of retirement savings.

2.7.6 Post retirement expenditure model in real terms (Blanchett, 2014)

Author shares finding that retirees tend to reduce expenditures on and after retirement, contradicting leading economic theories. Data from "the Bureau of Labor Statistics' Consumer Expenditure Survey" was used to examine this research. This analysis finds that actual retiree spending does tend to decline in retirement by an average of about 1% annually, but the rate of reduction increases for several years after retirement before declining again late in retirement. Author showed that retiree increases consumption faster than the inflation rate and thus overall spending declines over the retirement period in real terms.

The model involves estimating the annual expenditures retirees will face, considering both essential and discretionary spending categories. Essential expenses typically include housing, healthcare, food, utilities, and transportation, while discretionary expenses cover travel, hobbies, and other lifestyle-related activities. These estimates are then adjusted for inflation to reflect the anticipated increase in costs over time. The adjustment process involves applying an expected inflation rate to current expenditure levels to project future spending needs accurately.

One of the significant advantages of the Post-Retirement Expenditure Model in Real Terms is its ability to provide a realistic picture of financial requirements during retirement. It helps retirees avoid the pitfall of underestimating their future costs, which can lead to a shortfall in retirement savings. By planning in real terms, individuals can better understand how much they need to save and invest during their working years to ensure their savings grow at a rate that outpaces inflation.

Furthermore, this model assists in making informed decisions about investment strategies and withdrawal rates. For example, a retiree might opt for investments that provide a hedge against inflation, such as Treasury Inflation-Protected Securities (TIPS), real estate, or equities. Additionally, understanding real-term expenditure helps in setting sustainable withdrawal rates from retirement accounts, preventing the premature depletion of funds.

2.7.7 Probability distribution based withdrawal model (Suarez, 2015)

Researcher developed iterative withdrawal strategies from retirement portfolios called the Perfect Withdrawal Amount, which can be considerably higher by avoiding the usual behavioral biases. It also followed a rule driven strategy by constructing and sequentially applying a probability distribution. Historic distribution of return rates as the probability distribution of future returns was used, assuming it to be independent and identical in all periods.

At the heart of this model is the use of simulations, which run thousands of scenarios to project various possible outcomes for a retiree's portfolio over time. These simulations consider factors such as different rates of return, inflation rates, and spending needs, generating a probability distribution of potential future portfolio values. By analyzing these distributions, retirees and financial planners can identify an optimal withdrawal strategy that maximizes the likelihood of maintaining sufficient funds throughout retirement while also balancing the retiree's lifestyle and spending requirements.

One of the significant advantages of this model is its adaptability. For instance, in years where the portfolio performs better than average, the model might suggest higher withdrawals, allowing the retiree to enjoy a better standard of living. Conversely, in years of poor performance, the model would recommend lower withdrawals to preserve the portfolio's longevity. This dynamic approach helps mitigate the risk of depleting retirement funds prematurely, which is a common concern with fixed-percentage withdrawal methods.

Moreover, the Probability Distribution Based Withdrawal Model can incorporate personal factors such as the retiree's health status, expected healthcare costs, and other individual circumstances, making it a personalized and holistic approach to retirement planning. By continuously updating the withdrawal strategy based on actual portfolio performance and changing personal circumstances, this model offers a more realistic and robust framework for managing retirement income.

2.7.8 Quantile optimization model (Xu, 2018)

This research creates a formulaic method to obtain a closed-form solution of the maximum withdrawal for each simulated scenario. Researcher choose the quantile (target ruin) of all the maximum withdrawals as the final optimal solution. The runtime

is dramatically decreased (within seconds). Based on this methodology, this research has also built a non-linear optimization model using an adjusted Lagrange method to solve the optimal allocation of each asset in the portfolio which can result in the optimal withdrawal level. Longevity risk was covered under this model.

The model aims to provide a more personalized and resilient retirement plan by ensuring that the desired levels of income are achieved with a certain probability. For instance, a retiree might aim to have a minimum income level that they are 95% confident of achieving, reflecting a conservative risk approach. Alternatively, another retiree might focus on optimizing the 50th percentile, reflecting a balanced approach between risk and reward. This flexibility makes the Quantile Optimization Model particularly attractive in the context of retirement planning, where individual preferences and risk tolerances can vary significantly.

The methodology behind this model involves advanced statistical techniques such as quantile regression, which estimates the relationship between variables for different quantiles of the dependent variable, rather than just the mean. By applying these techniques, financial planners can develop strategies that are robust under various economic scenarios and market conditions. This robustness is crucial in retirement planning, where unexpected market downturns or changes in personal circumstances can have significant impacts on retirement outcomes.

Moreover, the Quantile Optimization Model can incorporate a wide range of factors, including investment returns, inflation, healthcare costs, and longevity risk. By accounting for these variables, the model provides a comprehensive framework for retirement planning that can adapt to changing conditions over time. This adaptability is a significant advantage over more static models, which may not adequately account for the dynamic nature of financial markets and personal life event.

Chapter - 3

RESEARCH METHODOLOGY

Chapter Orientation

Chapter 3 presents the research methodology adopted for developing and validating a dynamic post-retirement fund management model tailored to the behavioral, financial, and lifestyle realities of Indian retirees. This chapter is methodologically central to the thesis, as it provides the blueprint for how data was gathered, structured, validated, and operationalized into an adaptive machine learning-based scoring framework. Unlike traditional studies that rely on static actuarial assumptions or fixed withdrawal strategies, this research deploys a mixed-methods, multi-phase design to construct a dynamic, personalized retirement planning model based on actual behavioral constructs—preparedness, preferences, and expectations.

This chapter is structured to ensure conceptual clarity, replicability, and scientific rigor. It outlines the scope of the study, highlights the research gap, articulates the research problem and objectives, details the research design and instrument development, and explains the data collection process and model testing protocol. The methodology is rooted in both exploratory and confirmatory traditions, ensuring that the model developed is both theoretically sound and empirically robust.

Scope and Context of the Study

The chapter begins by delineating the scope of the study, focusing on retired salaried individuals from the urban Indian service sector, including professionals from fields such as education, healthcare, finance, IT, and administration. The rationale for this focused scope is multifold: (1) this group represents a segment most likely to engage with formal retirement planning tools like EPF, NPS, mutual funds, and annuity products; (2) the sector faces unique retirement challenges in balancing financial security with lifestyle aspirations; and (3) empirical data on retirement behavior in India is scarce, particularly for formally employed retirees outside the government sector.

Geographically, the study spans 10 metropolitan cities, ensuring diversity in terms of exposure, financial inclusion, and planning behavior. The unit of analysis is an individual who has completed at least one year of retirement and is financially independent or semi-dependent. This ensures that respondents have adequate post-retirement experience to reflect on preparedness, satisfaction, and lifestyle adjustments.

Research Gap and Problem Definition

A detailed review of global and Indian literature (Chapter 2) reveals that while retirement planning has gained traction in academic and policy discussions, there is a lack of dynamic, behavior-integrated models that go beyond financial adequacy. Most models are static, assuming homogeneity in retiree goals, income patterns, and risk tolerance. Furthermore, studies in the Indian context rarely explore the interplay between retirement expectations, post-retirement preferences, and preparedness, despite their proven influence on retirement satisfaction in Western studies.

The research gap is particularly stark when it comes to the integration of machine learning (ML) in retirement planning. While ML models are increasingly used in marketing, insurance underwriting, and credit scoring, their use in behavior-based retirement plan matching and satisfaction prediction is negligible in Indian financial literature. This gap provides the rationale for the present study, which proposes a data-driven, ML-enabled model that adapts retirement planning recommendations to personal traits and behavioral clusters.

The research problem is thus defined as the absence of a dynamic, personalized fund management model that can optimize retirement satisfaction by incorporating an individual's preparedness, preferences, and expectations.

Research Objectives and Hypotheses

To address this gap, four core research objectives were framed. Aligned with these objectives, a set of eight hypotheses (H01 to H08) were developed to empirically test the direct and mediated relationships among key constructs. These hypotheses test the causal pathways and mediating roles of preparedness and preferences in the link between expectations and satisfaction—forming the structural framework later used for machine learning.

Research Design and Methodological Flow

The study follows a three-phase mixed-method design, ensuring a balance between exploratory insights and statistical validation:

Exploratory Phase

The study began with Focus Group Discussions (FGDs) and In-depth Interviews:

FGDs were conducted across age groups (including retirees and pre-retirees) to understand emerging concerns, lifestyle preferences, health planning behavior, and psychological readiness.

In-depth Interviews were held with experts from LIC, SBI Wealth, HDFC Life, ICICI Prudential, and PolicyBazaar to understand the design logic behind current retirement plans.

The insights from this phase led to the development of the questionnaire, ensuring contextual relevance and content validity.

Survey Phase

A structured questionnaire was administered to a statistically significant sample of retired service sector employees. The constructs measured include:

- 12 first-order variables under preparedness, preferences, and expectations,
- 5 dimensions of retirement satisfaction,
- 3 second-order latent constructs.

Validation of measurement instruments was conducted using Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA). Composite reliability, AVE, and discriminant validity were assessed as per Hair et al. (2007) guidelines.

Model Testing Phase

In the final phase, a machine learning-based scoring model was created. The methodology involved:

- Calculating factor weights for each variable using SEM outputs,
- Scoring each cluster segment (identified via k-means clustering) using weighted averages,
- Matching these clusters with expert-rated LIC plans on preparedness, preferences, and expectations dimensions,
- Using confusion matrix logic to test the predictive strength of the model.

Pilot Study with LIC India

To validate the model's real-world applicability, a pilot study was conducted with LIC India. A senior official (Mr. B.P. Sodani) was consulted to score five retirement plans (Jeevan Nidhi, Jeevan Umang, Jeevan Anand, New Endowment Plan, New Jeevan Shanti) on their alignment with behavioral constructs. These expert scores were merged with cluster-specific inputs to generate satisfaction scores for each cohort-plan pair.

This demonstration proved that the model can be trained on real data, satisfaction can be predicted based on behavioral alignment, and recommendations can be personalized using data-driven scoring logic.

Instrument Construction and Validity

The questionnaire was constructed using Rossiter's C-OAR-SE protocol, ensuring that constructs were properly defined, operationalized, and scaled. Indicators for all latent constructs were refined based on pilot testing, and only those meeting minimum factor loading thresholds were retained. Reliability scores (Cronbach's $\alpha > 0.7$) and validity measures (CR, AVE) confirmed the robustness of the instrument.

Chapter 3 presents a comprehensive methodology that blends qualitative exploration, quantitative validation, and algorithmic modeling to develop a behavior-centric, ML-powered retirement planning model. Every methodological decision—from sample selection to instrument design to model testing—is logically linked to the research problem and objectives. This structured approach ensures that the study is not only academically rigorous but also practically scalable, policy-relevant, and adaptive to emerging retirement planning needs in India.

Chapter - 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION

This chapter outlines the methodology adopted for developing a dynamic post-retirement fund management model that accounts for preparedness, preferences, and expectations of retired individuals. The research design, sampling strategy, data collection process, analytical tools, and model-building approach are described in detail. The chapter begins with the need and scope of the study. It is followed by the objectives of the study, formulated to address the identified research gaps. The next section justifies the research design used in the study, sampling procedures, sampling size, and methodology. The preparation and refinement of the questionnaire are described in the following section. The final section summarizes the data processing procedures and statistical procedures used for the evaluation of the study model.

3.2 SCOPE OF THE STUDY

This study focuses on the development of a dynamic post-retirement fund management model, emphasizing the role of preparedness, preferences, and expectations in determining retirement satisfaction. The scope is delimited to retired salaried individuals from the formal Indian service sector, covering public and private sector roles in domains such as finance, education, healthcare, administration, information technology, and professional services.

The service sector was selected due to its rapid growth, increasing contribution to national GDP, and unique retirement challenges compared to manufacturing or agricultural sectors. Furthermore, a literature gap exists in retirement planning studies specifically targeting this sector, which is highly urbanized, formally organized, and more likely to participate in institutional savings mechanisms such as EPF, NPS, and employer-sponsored plans.

Geographically, the study is limited to retired service sector employees residing in the top 10 metropolitan cities of India—Delhi, Mumbai, Bengaluru, Chennai, Hyderabad, Pune, Kolkata, Ahmedabad, Jaipur, and Lucknow. These cities were chosen due to their high concentration of service sector employment, financial infrastructure, and access to diverse retirement planning instruments.

The unit of analysis in this research is an individual retired from salaried service sector employment, who has completed at least one year of retirement at the time of data collection. Respondents must also be financially independent or semi-dependent and have access to financial products or planning tools post-retirement.

The study excludes retirees from the unorganized sector, informal labor force, or those employed primarily in agriculture or traditional family businesses, as these segments follow significantly different retirement behavior and planning patterns.

This well-defined scope ensures that the research findings are contextual, meaningful, and actionable for stakeholders such as pension fund managers, policymakers, wealth advisors, and retirees in urban India.

3.3 RESEARCH GAP

Extensive review of literature suggests that lot of research were done in developed nations due to higher retirement planning participants. Studies related to wealth management and retirement satisfaction are scares in service sector of India. Most of the studies try to identify factors associated with wealth maximization and suggest mix of spendings and savings as outcome of studies. These studies tried to capture effect of extraneous factors on wealth management model. These models however lack personalization and adaptiveness.

Lusardi and Mitchell pioneered in retirement planning and financial literacy. Many researchers developed this model and introduced multiple influencers. These models however limit itself to generalized model where fix proportions of savings and spendings are proposed. Thus, a model is required which changes dynamically with external variables and develops itself for better accuracy.

Existing literature offers limited insights into retirement behavior and satisfaction among India's service sector retirees, despite their growing numbers and economic relevance. Previous models have focused largely on financial adequacy without integrating behavioral and expectation-based factors. This study addresses this gap by proposing a personalized, behavior-driven wealth management model.

3.4 RESEARCH PROBLEM

The core research problem centers around the absence of dynamic and individualized fund management strategies for Indian retirees that take into account behavioral drivers

such as preparedness, lifestyle preferences, and future expectations. Thus, research problems focused under this study are as followed:

- Is there a relationship between retirement expectations and retirement satisfaction?
- How does retirement preparedness and retirement preferences affect relationship between retirement expectations and retirement satisfaction?
- Does dynamic wealth management models perform better than fixed wealth management models?

3.5 OBJECTIVES OF THE STUDY

Objectives of the study were designed with the following conceptual model:

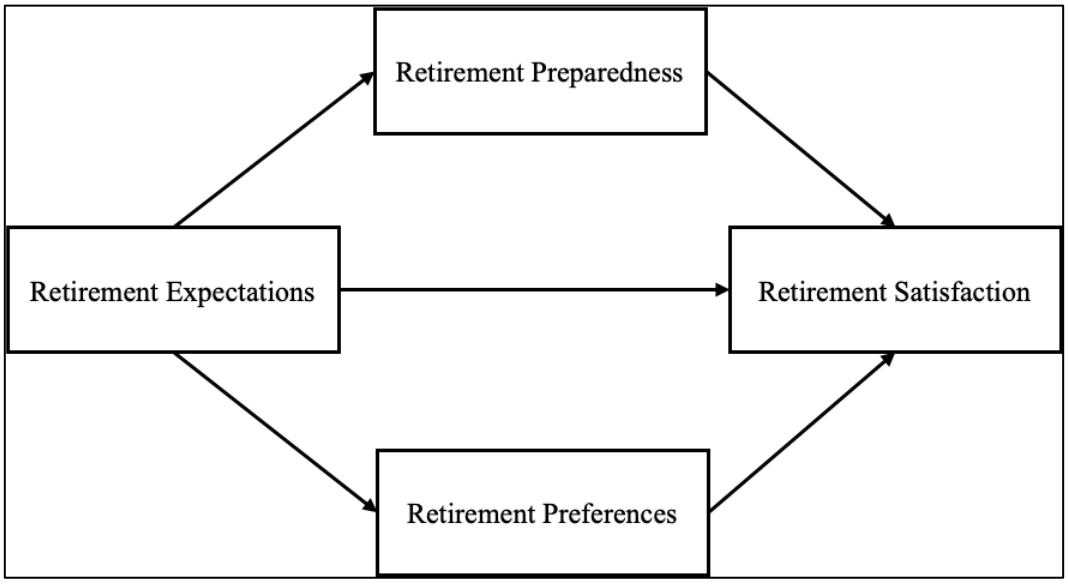

Fig. 3.1: Conceptual Model

Objectives of the research are:

i. To determine effect of retirement preparedness and retirement preferences on retirement satisfaction.

ii. To study the effect of retirement expectations on retirement preparedness, retirement preferences and retirement satisfaction

iii. To develop a dynamic fund management model which maximizes retirement satisfaction.

iv. To compare existing retirement models with the proposed dynamic model.

Research focuses on designing a retirement model that can maximize the retirement satisfaction of any individual associated with the model. Three dimensions are crucial

for designing this model, viz., retirement preparedness, post-retirement preferences and retirement expectations.

3.6 HYPOTHESIS

As per the objectives, framed in the study, following hypotheses were proposed for testing:

i. H_{01}: There is no significant relationship between retirement expectations and retirement preparedness
ii. H_{02}: There is no significant relationship between retirement expectations and retirement preferences
iii. H_{03}: There is no significant relationship between retirement preparedness and retirement satisfaction
iv. H_{04}: There is no significant relationship between retirement preferences and retirement satisfaction
v. H_{05}: There is no significant relationship between retirement expectations and retirement satisfaction
vi. H_{06}: There is no significant indirect effect of mediator (retirement preparedness) on retirement satisfaction
vii. H_{07}: There is no significant indirect effect of mediator (retirement preferences) on retirement satisfaction
viii. H_{08}: There is no significant direct effect of retirement expectations and retirement satisfaction

3.7 RESEARCH DESIGN

Research design provides "blueprint being followed during collection, measurement and analysis of the data". The research followed a mixed-method, three-phase design:

3.7.1 Exploratory Phase:

Exploratory research was conducted to identify factors affecting retirement satisfaction. Exploratory research was conducted in three phases:

3.7.1.1 Focus Group Discussion

Focus group discussions were planned to explore multiple factors which might be missed during literature survey or to identify the factors which might have become more relevant in current Indian context.

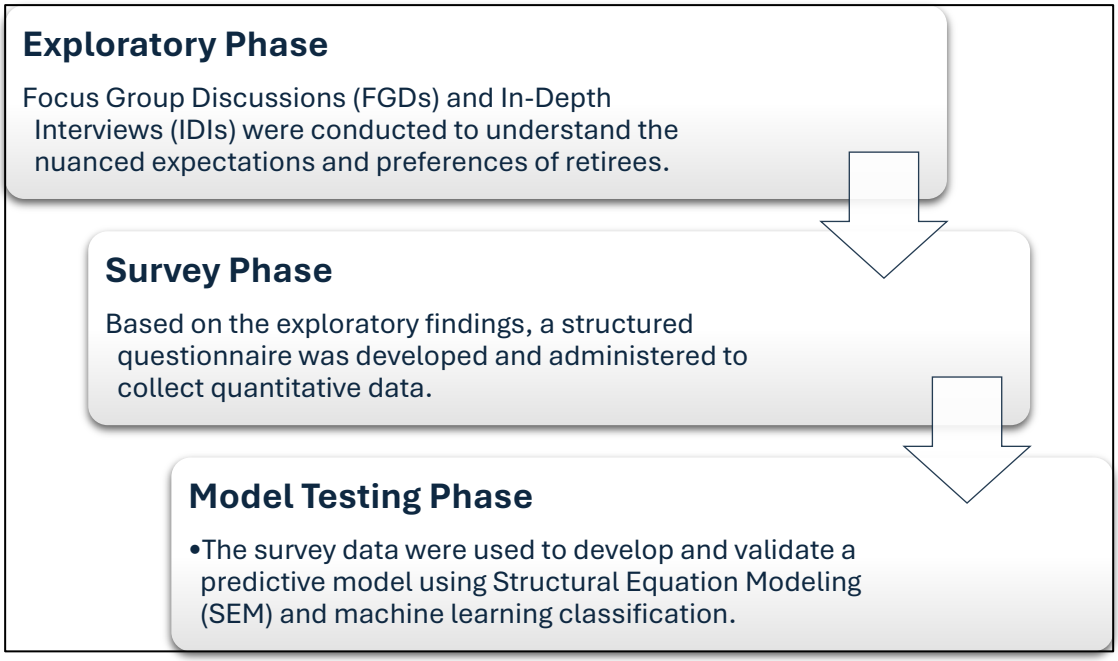

Fig. 3.2: Research Design

Through FGDs conducted across different age groups, different expectations were identified. FDGs also tried to understand different preferences, retirement planners have, during retirement planning phase. These FGDs included discussion on different aspects on which planners should prepare contingency plan.

Some FGDs (five FGDs) were conducted with the mix age group while few FGDs (two FGDs) of them were done with retired individuals' group only. These FGDs were done to ensure that perspective of different generations can be taken to make study more relevant for near future. FDG details are as followed:

Table 3.1: FGD Sample Details

FGD No.	Total Participants	Retired : Non-retired	Male: Female
1	5	5:0	4:1
2	6	6:0	5:1
3	5	2:3	3:2
4	5	1:4	4:1
5	6	1:5	0:6
6	5	2:3	1:4
7	5	3:2	4:1

3.7.1.2 In-depth Interviews

In depth interviews were conducted to understand other side of the wealth management scenario. Interaction was done with relevant industry expert to understand basis on which different wealth management plans are designed.

In-depth interviews were required to understand different investment options viable in India. These Interviews were planned with bank personals and executives of organizations facilitating purchase of these options. Managers and Wealth management consultants were contacted for the physical meeting or telephonic discussion. Institutions involved in these discussions were ICICI Prudential, HDFC Life, SBI Wealth, LIC, Policy Bazar.

3.7.2 Survey Phase:

Quantitative research comprises of survey conducted with retired individuals, with the objective of identifying and establishing relationship between retirement planning and retirement satisfaction.

3.7.3 Model Testing Phase:

Proposed machine learning model included preparedness, preferences and expectations as parameters while suggesting wealth management solutions. Measures of retirement satisfaction and expected satisfaction levels were used in order to create a confusion matrix. This machine learning model aims at improving satisfaction levels by improvising confusion matrix over a period.

A pilot study was conducted with one organization (LIC India). Model was developed by comparing plans offered by LIC of India. Interaction was done with an expert (LIC Policy Official: Mr. B. P. Sodani). He was first briefed the context in which this study is structured. Plans were suggested, meeting all of the following criteria:

- Suitable for retirement planners
- Individuals in pre-retirement phase
- Individuals in service (excludes businesses and unemployed categories)
- Annuity based plans (excludes one time or lump-sum payment options)

Five plans were suggested which are:

- LIC Jeevan Nidhi
- LIC Jeevan Umang

- LIC Jeevan Anand
- LIC New Endowment Plan
- LIC New Jeevan Shanti

Constructs were shared with the expert and he was requested to give ratings to each of the plan, based on relevance. These scores were requested for each of the construct. These scores, alongwith factor loadings were used to calculate expected satisfaction level. LIC plan offering highest satisfaction level is recommended for respective Cohorts.

Financial institutions can further take feedback from customer. This feedback can be used to map expected satisfaction levels with actual satisfaction achieved. Such customer data can be integrated into database to train model.

Pilot study was conducted to test feasibility of the model. Same model can be further replicated by any other banking or insurance organization. Scores for calculations can be generated based on consensus of company experts or feedback of Industry experts. This robust system can ensure secured and expandable model which improvises with every recorded interaction between customers, financial institutions and public bodies.

3.8 SAMPLING

3.8.1 Sampling Technique

Two different type of sampling is possible, probability and non-probability sampling technique. Probability sampling technique is one in which each unit in this universe has equal probability of being selected as sample for the study. It can also be understood as the random method of the selection. Non-probability sampling technique is a technique where sampling is done based on the judgement or convenience of the researcher.

This study had sample collection at different phases:

Phase 1: FGDs and focus group discussions

In exploratory study, FGDs and focus group discussions were done. For FGDs, 7 groups were made, 2 of which were of retired personnels only while rest 5 had mix of different age group individuals. Convenient sampling was done to ensure good mix of different

culture, age, gender and income levels. It was ensured that all participants are comfortable with financial terms and have awareness on wealth management.

Phase 2: Personal Interviews

For personal interviews, sources were again selected as per convenience. It was however ensured that two persons of same organization, but different locations, participate in in-depth interviews.

Phase 3: Survey

For survey, un-controlled quota sampling was used. Uncontrolled quota sampling was used to select respondents from the service sector across the top 10 cities. Quotas were established based on city, employment sector, gender, and age bracket (60–75 years). Within these quotas, respondents were accessed via banking networks, senior citizen associations, and personal referrals. This method was suitable given the absence of a national database of retirees segmented by sector.

The study employed a non-probability sampling method—specifically, uncontrolled quota sampling—to select participants across the top 10 metropolitan cities in India. This technique was chosen due to its feasibility and efficiency in reaching a targeted group of respondents, particularly retirees from the service sector, who are often difficult to identify through purely random sampling methods.

Uncontrolled quota sampling involves dividing the population into subgroups (or quotas) based on specific characteristics such as location, gender, or employment type, and then selecting respondents non-randomly within each quota based on convenience or availability (Malhotra, 2010). Unlike controlled quota sampling, it does not enforce strict supervision on the exact distribution within each subgroup, allowing for quicker and more practical data collection in real-world settings.

In this study, the following quotas were defined in advance:

- City-level quota: Retirees were sampled from Delhi, Mumbai, Bengaluru, Chennai, Hyderabad, Pune, Kolkata, Ahmedabad, Jaipur, and Lucknow.

- Sector-level quota: Only respondents who had retired from the formal service sector were included.

- Demographic quota: Efforts were made to ensure diversity in age brackets (between 60–75 years), gender, and pre-retirement job roles.

3.8.2 Population

Population refers to the set of individuals from which samples can be driven for the study. For this study, population refers to all Indian citizens who were in service sector. Retired individuals satisfying above condition forms the population for the study. For the study Top 10 Tier-I and Tier-II cities were selected. These cities were selected on the basis of population opting wealth management.

3.8.3 Sampling size

As per 2011 census, 58 million Indian were retired and taking benefit of pension or similar options post-retirement. This is our population. For the calculation of appropriate sample size,

Cochran's formula for sample size determination was used (Cochran, 1940):

$$n= p * (1- p)* (z/e)^2$$

$$n= 0.50* (1- 0.50)* (1.96/0.05)^2$$

$$n= 385$$

Where,

n= Sample size

p = probability of occurrence of any event expressed as a percentage

(1- p) = Probability of non –occurrence of any event

e = Variance expected in the result. 0.05 is the tolerance level in the present study.

Z= Confidence level that determine the level of error of error allowed in the research.

Here, in the research confidence level is 95% and the Z score value is 1.96

CI = 90% , Z score =1.645

CI = 95% , Z score= 1.96

CI = 99% , Z score= 2.326

From the following formula, sample size of the data collection is 385 units. With 95% confidence Interval and 5% margin of error, ***385 was suggested sample size***. Thus, we targeted atleast 385 samples through quota sampling method.

From a structural modeling perspective, Hair et al. (2017) recommend a minimum sample of 10 times the maximum number of structural paths pointing at any construct in a Partial Least Squares Structural Equation Model (PLS-SEM). Given that the proposed model involved 5 latent constructs with up to 6 indicators per construct, a minimum sample size of ***200–300 was deemed acceptable for robust estimation***.

Both arguments suggested that about 400 samples should be sufficient. Additionally, to train and validate the machine learning component of the study (predicting retirement satisfaction levels), a reasonably large dataset was necessary to avoid overfitting and ensure generalizability. Thus, 25% additional samples (additional 100 samples) were considered.

Survey started with 500 sample target. The achieved valid sample size of 448, exceeds above suggested threshold and supports both measurement and structural model testing.

3.8.4 Sample unit

Most of the companies targets metropolitan and Tier-1 cities. It's because, higher cost of living makes retirement planning more relevant in big cities. Thus, top 10 metropolitan cities can be considered for the study. Study will also consider factors which varies for different cities so that final model can be generalized for different locations. Proposed sampling for 500 sample was as followed:

Table-3.2: Proposed sampling for causal research

		Population Estimates			***Sample Count***				
	Metro City	**Total (Lks)**	**M:F**	**Private: Public**	***Total***	***Gender***		***Sector***	
						M	***F***	***Private***	***Public***
1	Mumbai	42	60:40	70:30	97	52	45	62	35
2	Delhi	38	62:38	68:32	86	46	40	54	32
3	Bangalore	34	65:35	75:25	66	34	32	46	20
4	Hyderabad	29	64:36	72:28	53	27	26	41	12
5	Ahmedabad	23	63:37	69:31	44	23	21	33	11
6	Chennai	32	61:39	70:30	36	18	18	27	9

7	Kolkata	28	60:40	65:35	35	18	17	27	8
8	Surat	18	66:34	73:27	35	20	15	26	9
9	Pune	21	64:36	74:26	24	12	12	15	9
10	Jaipur	16	62:38	67:33	24	13	11	18	6

418 samples were collected which were appropriate for analysis. These samples were close to the proportions of gender and sector, identified for each city. We want to limit scope of this study to India as culture, lifestyle, investment options and employment conditions varies significantly for other countries.

3.9 DATA COLLECTION

Study comprises of data from both primary as well as secondary source. Primary data was collected for exploratory research, during survey and during comparision of proposed model from existing models. Extensive review of literature was done to understand relationship between different factors.

3.9.1 Secondary Data

Secondary data was collected from multiple sources including:

A) Reports and data from Government of India websites like:

1. National portal of India (https://www.india.gov.in/data-portal-india)
2. Open Government Data Platform India (https://data.gov.in/)
3. MoSPI (https://www.mospi.gov.in/)
4. Census of India (https://www.censusindia.gov.in/)
5. myScheme (https://www.myscheme.gov.in)
6. NITI Aayog (https://www.niti.gov.in/sites/default/files/2020-01/Blockchain_The_India_Strategy_Part_I.pdf)

B) Official websites of banking and finance bodies including:

1. RBI (https://www.rbi.org.in/)
2. ICICI Bank (https://www.icicibank.com/wealth-management)
3. ICICI Prudent Life Insurance (https://www.iciciprulife.com/retirement-pension-plans/guaranteed-pension-plan.html)
4. HDFC Bank (https://v.hdfcbank.com/wealth/index.html)
5. HDFC Life Insurance (https://www.hdfclife.com/retirement-and-pension-plans)

6. Bajaj Allianz Life Insurance (https://www.bajajallianzlife.com/)
7. Life Insurance Corporation of India (https://licindia.in/pension-plan)
8. SBI Life Insurance (https://www.sbilife.co.in/en/life-insurance/retirement-pension-plans)
9. National Insurance Company Limited (https://nationalinsurance.nic.co.in/)
10. Policy Bazar (https://www.policybazaar.com/)

C) Research Papers and Book Chapters from reputed publishers and Journals

3.9.2 Primary Data

Forms were administered by representatives of wealth management and insurance sections of banks. These representatives were referred by colleagues from ICICI Bank, SBI Bank and LIC Pvt. Ltd. Each contacted representative was requested to collect samples from 10 retired individuals who are known to them. It was also requested to even include few individuals who were not their customers. Most of the representatives agreed on sharing data, except few who asked monetary support for the same. Collection plan was as followed:

Table-3.3: Sample collection plan

				Collection Target (10 samples per Representative)	
	Metro City	***State***	***Total***	***Representatives No.***	***Total Target***
1	Mumbai	Maharashtra	97	10	100
2	Delhi	Delhi	86	9	90
3	Bangalore	Karnataka	66	7	70
4	Hyderabad	Andhra P.	53	6	60
5	Ahmedabad	Gujarat	44	5	50
6	Chennai	Tamil Nadu	36	4	40
7	Kolkata	W. Bengal	35	4	40
8	Surat	Gujarat	35	4	40
9	Pune	Maharashtra	24	3	30
10	Jaipur	Rajasthan	24	3	30
TOTAL			500	55	550

Out of 550 planned responses, only 483 valid responses were found. All incomplete and non-relevant survey data was removed from the database. It is further discussed in Analysis chapter that 35 responses out of these 483 responses were identified as biased responses. Thus, final analysis was limited to 448 valid responses. Survey was prepared on Google Forms. Demographic data was checked to calculate proportion of gender and sector. Following gender proportion was received in the final sample set:

Table-3.4: Sample gender proportion

	Metro City	***Total***		***Gender Proportion Planned***		***Gender Proportion Actual***	
		Planned	***Actual***	***M***	***F***	***M***	***F***
1	Mumbai	97	79	52	45	43	36
2	Delhi	86	69	46	40	33	36
3	Bangalore	66	68	34	32	30	38
4	Hyderabad	53	52	27	26	21	31
5	Ahmedabad	44	39	23	21	19	20
6	Chennai	36	33	18	18	14	19
7	Kolkata	35	33	18	17	18	15
8	Surat	35	31	20	15	15	16
9	Pune	24	23	12	12	9	14
10	Jaipur	24	21	13	11	9	12
TOTAL		**500**	**448**	**263**	**237**	**211**	**237**

Following sector proportion was received in the final sample set:

Table-3.5: Sample sector proportion

	Metro City	***Total***		***Sector Proportion Planned***		***Sector Proportion Actual***	
		Planned	***Actual***	***Private***	***Public***	***Private***	***Public***
1	Mumbai	97	79	62	35	50	29
2	Delhi	86	69	54	32	46	23
3	Bangalore	66	68	46	20	41	27

4	Hyderabad	53	52	41	12	39	13
5	Ahmedabad	44	39	33	11	32	7
6	Chennai	36	33	27	9	26	7
7	Kolkata	35	33	27	8	25	8
8	Surat	35	31	26	9	23	8
9	Pune	24	23	15	9	16	7
10	Jaipur	24	21	18	6	16	5
TOTAL		**500**	**448**	**349**	**151**	**314**	**134**

3.10 Research Instrument

A structure questionnaire was used as a research instrument for the study. Questionnaire was developed Google Forms. Access to this app was given to all representatives through QR codes. This way of sharing form ensured easy access through mobile phones. All content in questionnaire was present in two languages viz. English and Hindi. As representatives were working in respective regions, they were comfortable translating questions into local dilect. Questionnaire comprised of following section:

Introduction: Introduction section greets respondent and assure them that their responses will be used for academic purpose. Animosity was also promised while publishing results and analysis on any forum.

Demographic Details: Demographic details like gender, age, job sector etc. were asked. This was required to ensure correct bifurcation of samples.

Retirement Expectations: This section covers questions related to the expectations from retired life. Questions were designed to understand their expectations at the time of service and when they were planning for retirement. Five point Likert scale was used for the same.

Retirement Preparedness: This section of the questionnaire was trying to understand level of preparedness on different front. Extent and type of preparedness was judged through these questions. Five point Likert scale was used for the same.

Retirement Preferences: Individuals have different priorities towards health, family, wealth, lifestyle etc. These preferences were expected to influence investment choices over pre-retirement period. Questionnaire tried to understand these preferences through this section. Five point Likert scale was used for the same.

Retirement Satisfaction: Different measures were identified from literature review. These measures directly or indirectly indicate level of satisfaction of an individual from retired life. Individuals' level of satisfaction was measured in this section of the questionnaire. Five point Likert scale was used for the same.

3.11 Clarification of Wealth Management Models

One of the central contributions of this study is the development of a dynamic post-retirement fund management model, grounded in the principles of wealth management and behavioral finance. To contextualize this contribution, it is essential to clarify what is meant by "wealth management models" in the retirement planning domain.

3.11.1 Defining Wealth Management Models in Retirement

Wealth management in retirement involves strategic planning, investment, and withdrawal decisions that help individuals sustain their financial well-being while meeting personal lifestyle and health goals. Traditional models are generally static in nature, relying on deterministic rules such as the "4% withdrawal rule," fixed annuity allocations, or linear consumption paths. These models often overlook individualized behavior, changing expectations, or real-time financial stressors (Lusardi & Mitchell, 2014).

3.11.2 Need for Dynamic Wealth Management

The inadequacy of traditional models has led to the rise of dynamic wealth management frameworks, which emphasize flexibility, responsiveness to life events, and personal goal alignment. Dynamic models use feedback from behavioral inputs, updated financial data, and scenario simulations to revise investment and withdrawal strategies continuously.

This study builds upon this evolving paradigm by designing a model that is not just dynamic in structure but also personalized in content—guided by three core behavioral pillars:

- **Preparedness** (knowledge, planning, risk tolerance)
- **Preferences** (lifestyle, learning, health, social activities)
- **Expectations** (financial, emotional, and personal fulfillment)

3.11.3 Structure of the Proposed Model

The proposed model operates in two stages:

1. **Behavioral Mapping through Structural Equation Modeling (SEM):** Using SEM (via R and Python Libraries), the study quantifies how preparedness and preferences affect retirement satisfaction both directly and through the mediation.
2. **Predictive Simulation through Machine Learning:** A supervised machine learning model classifies individuals into satisfaction categories (low, medium, high) based on their behavioral and demographic inputs. This phase helps test the model's predictive power and real-world applicability.

3.11.4 Practical Use and Contribution

The resulting model functions as a decision-support framework for financial planners, retirees, and policymakers. It enables:

- Scenario planning and dynamic budget adjustments
- Personalization of fund allocation strategies
- Integration of subjective well-being factors into financial planning

By shifting from static projections to adaptive, behavior-driven wealth management, the model addresses both the financial and emotional longevity needs of modern retirees in the Indian service sector.

3.12 Data Analysis Technique

To derive meaningful insights from the data collected, a combination of quantitative and computational analysis techniques was applied. The analytical strategy was aligned with the study's multi-phase design and research objectives, focusing on understanding the influence of preparedness, preferences, and expectations on retirement satisfaction, and validating the proposed dynamic post-retirement fund management model.

3.12.1 Descriptive Analysis

Basic descriptive statistics were used to summarize the demographic profile of respondents and to understand central tendencies (mean, median) and dispersion (standard deviation) across key variables such as income sources, financial literacy, preferred retirement lifestyle, and savings behavior. These analyses were conducted using *Python* on *Jupyter Lab v4.3.2.*

3.12.2 Reliability and Validity Testing

The internal consistency of the constructs was assessed using Cronbach's Alpha and Composite Reliability (CR). Average Variance Extracted (AVE) was used to test convergent validity, while discriminant validity was evaluated using the Fornell-

Larcker criterion. These procedures ensured measurement robustness and construct clarity.

3.12.3 Exploratory Factor Analysis (EFA)

EFA was conducted during the pilot survey phase to explore latent constructs from the responses related to retirement preferences, financial satisfaction, and lifestyle choices. Principal Component Analysis (PCA) with Varimax rotation was used to extract factors. This helped refine the questionnaire items and validate initial groupings of variables.

3.12.4 Confirmatory Factor Analysis (CFA)

After finalizing the constructs, CFA was performed using `SeminR` library of R (in R Studio) to confirm the factor structure of the measurement model. This step ensured the model's fit and validated the relationships between observed variables and latent constructs (preparedness, preferences, expectations, satisfaction).

3.12.5 Structural Equation Modeling (SEM) and Mediation Analysis

To test the hypothesized relationships and mediation effects (e.g., the mediating role of expectations between preparedness/preferences and satisfaction), Partial Least Squares Structural Equation Modeling (PLS-SEM) was applied. This technique was suitable due to the exploratory nature of the model and the presence of both direct and indirect paths.

3.12.6 Predictive Model Testing: Machine Learning

In the model testing phase, a machine learning classification algorithm was developed to predict retirement satisfaction categories (low, moderate, high) based on inputs related to financial preparedness, lifestyle preferences, and expectation alignment.

- Techniques used included Decision Trees and Random Forests for classification.
- Model performance was evaluated using metrics such as accuracy, precision, recall, and confusion matrix.
- This phase was implemented using Python 3.9 (Anaconda environment) with libraries such as `scikit-learn`, `pandas`, and `matplotlib`.

The hybrid approach of SEM and machine learning enabled the study to achieve both explanatory and predictive validity for the proposed dynamic retirement model.

Chapter - 4

DATA ANALYSIS AND INTERPRETATION

Chapter Orientation

Chapter 4 presents the empirical foundation of the study by detailing the results of various statistical analyses conducted to validate constructs, test hypotheses, and demonstrate the application of the proposed machine learning-based dynamic retirement fund management model. This chapter is the analytical heart of the thesis, linking the conceptual framework (Chapter 1), literature review (Chapter 2), and methodological design (Chapter 3) to the final outcomes and model validation efforts discussed in Chapter 5.

The central aim of Chapter 4 is to establish empirical relationships among retirement preparedness, preferences, expectations, and satisfaction, and to demonstrate how these relationships can be operationalized through a dynamic scoring model. The chapter is organized into distinct, logically progressing sections that reflect the data flow—from instrument validation to structural modeling, clustering, and real-world model demonstration using LIC plans.

This chapter adopts a multi-method analytical approach using both classical statistical techniques and machine learning elements. Techniques such as Exploratory Factor Analysis (EFA), Confirmatory Factor Analysis (CFA), Structural Equation Modeling (SEM), mediation analysis, k-means clustering, and machine learning-based scoring have been used to derive meaningful insights. The approach is comprehensive, ensuring that both measurement models (validating constructs) and structural models (testing relationships) are adequately addressed.

Variable Definition and Indicator Selection

The chapter begins with an overview of the variables used in the study—organized into first-order and second-order constructs. These include:

- Retirement Preparedness (financial, health, emotional & social, family & legacy),
- Retirement Preferences (lifestyle, knowledge & skill enhancement, leisure & fulfillment),
- Retirement Expectations (financial stability, health, social engagement, personal growth),

- Retirement Satisfaction (financial, health, social, lifestyle, and life purpose satisfaction).

Indicators were refined through focus group discussions (FGDs), expert validation, and pilot testing. Factor loadings were used to assess the strength of each indicator's contribution to its construct. A table of pilot study factor loadings is presented (Table 4.1), and based on this, non-performing indicators were removed to strengthen instrument reliability.

Validity and Reliability Testing of Measurement Instrument

In this section, Rossiter's (2002) C-OAR-SE framework is applied to assess the construct validity and reliability of the instrument. The three core aspects of convergent validity—factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR)—are examined as per the guidelines provided by Hair et al. (2007).

- Factor loadings for first-order variables are presented (Table 4.3), indicating strong loading values for most indicators.
- Second-order factor loadings are detailed in Table 4.4 to validate the dimensional structure of preparedness, preferences, and expectations.
- Discriminant validity is ensured by comparing the square root of AVE with inter-construct correlations.
- Cronbach's Alpha is used to measure internal consistency.

These analyses confirm that the constructs used in the study are empirically distinct, internally consistent, and valid for hypothesis testing.

Structural Equation Modeling (SEM) and Hypothesis Testing

Having validated the constructs, the study proceeds to test the hypothesized relationships (H01 to H05) using SEM. Path coefficients, t-values, and p-values are calculated and presented in Table 4.10, confirming several statistically significant relationships. The key insights include:

- Retirement expectations have a negative influence on preparedness and satisfaction.
- Preparedness and preferences have positive effects on retirement satisfaction.
- All relationships are statistically significant at $p < 0.05$, thereby supporting the majority of the hypotheses.

This confirms that the causal framework underlying the dynamic model is statistically sound and supports the first two research objectives: determining relationships among expectations, preparedness, preferences, and satisfaction.

Mediation Analysis

To test mediated relationships (H06 to H08), mediation analysis is conducted using the bootstrapping method. Tables 4.11 to 4.13 present results for direct, indirect, and total effects. Key findings include:

- Preparedness partially mediates the relationship between expectations and satisfaction.
- Preferences fully mediate some indirect paths, particularly when preparedness is low.
- A significant direct effect of expectations on satisfaction persists, confirming partial mediation.

These findings strengthen the theoretical model by showing that not only do behavioral constructs interact in complex ways, but these interactions can be modeled and quantified, thereby justifying the machine learning scoring system used later.

Cluster Analysis for Behavioral Segmentation

In the next section, k-means clustering is applied to segment respondents based on their scores across key variables. Tables 4.14 to 4.16 display cluster means and behavioral characteristics, allowing the identification of four distinct groups:

- Unprepared Dreamers: High expectations, low preparedness and satisfaction.
- Aspirational Planners: High expectations and preferences, moderate satisfaction.
- Balanced Realists: Moderate levels across all constructs.
- Contented Savers: High preparedness, preferences, and satisfaction.

Each cluster reflects a unique behavioral persona, which is essential for personalizing retirement plan recommendations. These clusters are used in the scoring model for plan evaluation, linking back to the model's adaptive logic.

Machine Learning-Based Model Scoring

This section applies the machine learning-based scoring algorithm proposed in Chapter 3. Inputs from factor loadings, path coefficients, and expert-assigned plan scores are used to:

- Match each cluster with LIC retirement plans,
- Compute cluster-weighted scores (Table 4.19),
- Evaluate plan suitability using second-order factor scores (Table 4.20).

The model demonstrates that LIC New Jeevan Shanti consistently ranks highest across multiple clusters, validating the model's recommendation logic. The results confirm that satisfaction outcomes vary significantly by cluster and plan pairing, justifying the dynamic and personalized nature of the proposed model.

Model Demonstration with LIC Plans

This final section operationalizes the model using real data from LIC retirement plans, scored by a domain expert. Five plans are evaluated across the behavioral constructs:

- LIC Jeevan Nidhi
- LIC Jeevan Umang
- LIC Jeevan Anand
- LIC New Endowment Plan
- LIC New Jeevan Shanti

Each plan is scored based on relevance to preparedness, preferences, and expectations. These scores are then merged with cluster weights, and the highest satisfaction score per cohort is identified. The findings confirm that the model can provide personalized, data-driven recommendations, making it a viable tool for financial institutions and policy planners.

Chapter - 4

DATA ANALYSIS AND INTERPRETATION

In this chapter, assessment and examination of the proposed research methodology has been discussed. Various tools and techniques were used to attain the objectives of the study.

4.1 Variables

Review of literature gave many indicators for each of the variables. Focus group discussion helped in refining that list. Before moving on full scale analysis with the prepared list, pilot study was required to access convergent validity. Thus, first 100 samples collected from the survey were used to refine questionnaire. Survey was resumed with refined questionnaire as some questions were removed only.

For pilot study, indicators were identified for each of the variables. Factor loadings of these indicators on respective variables are listed in the table 4.1:

Table 4.1: Pilot study factor loadings

Ist Order Variables	Indicators -> Factors	Loadings
Financial Security & Stability Expectations	Savings and investment	0.742
	Expenses	0.6651
	Financial security and stability	0.7238
Health & Mental Well-being Expectations	Physical health	0.8409
	Social connection**	**0.355**
	Mental health	0.8112
	Stress management & emotional well being	0.8107
Social & Family Engagement Expectations	Social circle connect	0.8221
	Financial resources**	**0.462**
	Family relationship	0.7611
	Social activities	0.8196
Leisure, Relaxation & Lifestyle Expectations	**Financial resources****	**0.488**
	Social connection**	**0.398**
	Leisure activities	0.8104
	Lifestyle maintenance	0.7673

	Relaxed and stress free routine	0.7810
Personal-Growth, Fulfilment & Achievements Expectations	Personal growth	0.8115
	Financial resources**	**0.464**
	Social connection**	**0.351**
	Progress in personal goals	0.8328
	Learning experiences	0.8531
Financial Preparedness	**Personality traits****	**0.219**
	Planning finances	0.8346
	Financial resources sufficiency	0.7854
	Emergency financial needs	0.7626
Health Preparedness	Preventive health measures	0.8277
	Health literacy**	**0.592**
	Policy and environment**	**0.446**
	Curative health measures	0.8507
	Health coverage	0.8232
Emotional and Social Preparedness	Emotional preparedness	0.6472
	Social connect	0.6378
	Changes in social life	0.6908
Family & Legacy Preparedness	Family financial needs	0.7932
	Legacy planning	0.8152
	Financial support from family	0.7326
Lifestyle Preferences	**Community engagement****	**0.576**
	Physical fitness**	**0.124**
	Retirement lifestyle	0.8197
	Lifestyle preferences alignment	0.7642
	Plan to pursue lifestyle	0.7345
Knowledge and Skill-Enhancement Preferences	**Financial resources****	**0.386**
	Cultural background**	**0.421**
	Knowledge and skills enhancement	0.6957
	Continuous learning	0.7896
	New skill development	0.8078

Leisure and Personal Fulfilment Preferences	Leisure activities satisfaction	0.7724
	Personal fulfilment	0.7366
	Personal fulfilment through leisure activities	0.7743
Financial satisfaction	Financial security	0.7912
	Retirement finances	0.7853
	Unexpected expenses coverage	0.707
Health and Well-being Satisfaction	Overall health	0.8154
	Mental well being	0.7779
	Healthcare services and support	0.7512
Social Satisfaction	Social interactions	0.7645
	Connect with social circles	0.7501
	Engagement in social activities	0.7341
Lifestyle Satisfaction	Leisure activities fulfilment	0.7499
	Personal time balancing	0.7441
	Stress free and relaxed	0.6886
Life Purpose and Fulfillment	Personal achievement	0.7551
	Personal goals progress	0.7548
	Learning experiences fulfilment	0.7707

Interpretation from Table:

This table presents the factor loadings of various indicators on their respective first-order constructs as derived from a pilot sample of 100 responses. Most indicators showed acceptable loading values above 0.7, validating their relevance to the intended constructs. Indicators with loadings below 0.6 (e.g., *social connection*, *financial resources*, *personality traits*) were considered for removal for low validity. The purpose of this table is to assess convergent validity before finalizing the constructs for the full-scale study. Items that did not meet the required threshold were excluded in the revised questionnaire.

Link to Hypotheses or Objectives:

This table helps refine the measurement of *retirement expectations*, *preparedness*, and *preferences*, which are foundational for testing their effects on *satisfaction*.

[Objective ii]. It also Ensures valid measurement instruments for *hypotheses H01 to H05*, where reliable indicators are essential for accurate path analysis and mediation models. It directly supports building a robust dynamic fund management model *[Objective iii]* by identifying which factors meaningfully load onto decision-making constructs.

Based on this analysis of pilot study, indicators used for the variables in the main study are listed in table 4.2.

Table 4.2: Indicators for the variables

Ist order variables	Indicators
Financial security & stability expectations	Savings and investment
	Expenses
	Financial security and stability
Health & Mental Well-being Expectations	Physical health
	Mental health
	Stress management & emotional well being
Social & family engagement expectations	Social circle connect
	Family relationship
	Social activities
Leisure, relaxation & lifestyle expectations	Leisure activities
	Lifestyle maintenance
	Relaxed and stress free routine
Personal-growth, fulfilment & achievements expectations	Personal growth
	Progress in personal goals
	Learning experiences
Financial preparedness	Planning finances
	Financial resources sufficiency
	Emergency financial needs
Health preparedness	Preventive health measures
	Curative health measures
	Health coverage

Emotional and Social Preparedness	Emotional preparedness
	Social connect
	Changes in social life
Family & legacy preparedness	Family financial needs
	Legacy planning
	Financial support from family
Lifestyle preferences	Retirement lifestyle
	Lifestyle preferences alignment
	Plan to pursue lifestyle
Knowledge and Skill-Enhancement Preferences	Knowledge and skills enhancement
	Continuous learning
	New skill development
Leisure and Personal Fulfilment Preferences	Leisure activities satisfaction
	Personal fulfilment
	Personal fulfilment through leisure activities
Financial satisfaction	Financial security
	Retirement finances
	Unexpected expenses coverage
Health and Well-being Satisfaction	Overall health
	Mental well being
	Healthcare services and support
Social satisfaction	Social interactions
	Connect with social circles
	Engagement in social activities
Lifestyle satisfaction	Leisure activities fulfilment
	Personal time balancing
	Stress free and relaxed
Life Purpose and Fulfilment	Personal achievement
	Personal goals progress

	Learning experiences fulfilment

Interpretation from Table:

This table outlines the final set of indicators for each first-order variable after refining the questionnaire based on pilot study results (Table 4.1). Only indicators with satisfactory factor loadings were retained — generally those with loadings above 0.6, prioritizing those above 0.7. This curated list formed the basis for data collection in the main study, ensuring construct validity. Questions designed from these variables are mentioned in Annexure 4.

4.2 Instrument Validity and Reliability

For scale construction, Rossiter's (2002) protocol was used. It was done to access validity and reliability of constructs. Convergent Validity and Discriminant Validity are both subtypes of construct validity, which assesses whether a test or scale measures what it is intended to measure. Convergent and discriminant validity was measured for the scale items followed by measurement of reliability.

4.2.1 Convergent Validity

Convergent validity refers to the degree to which two or more measures of the same construct converge or are strongly correlated. As per convergent validity, measures of a construct should explain larger proportion of its variance (Hair et al., 2006). In evaluating convergent validity of a measurement model, Hair et al. (2007) recommend three key parameters:

- Factor Loadings (standardized outer loadings)
- Average Variance Extracted (AVE)
- Composite Reliability (CR)

These three indicators together confirm whether a set of indicators adequately represents a single latent construct — which is the essence of convergent validity.

4.2.1.1 Factor loading for Convergent validity

Factor loading is one of the three parameters to evaluate the scale item's convergent validity and it should ideally be ≥ 0.70 to indicate that the item explains a substantial portion of the variance in the construct (Hair et al., 2007). Vinzi et al. (2010) recommended factor loading above 0.7, but in social sciences, factor loading of 0.5 – 0.7 is also suggested as acceptable loadings.

4.2.1.1.1 Factor loading of all indicators on first order variables

Factor loading of all indicators on first order variables were calculated and is listed in the table 4.3.

Table 4.3: Factor loadings of first order variables

First Order Variable	Indicator	Loading
Retirement Expectations (Exp)		
Financial Security & Stability Expectations (FSSE)	FSSE1	0.7553
	FSSE2	**0.6662**
	FSSE3	0.7219
Health & Mental Well-being Expectations (HMWE)	HMWE1	0.8412
	HMWE2	0.8015
	HMWE3	0.8132
Social & Family Engagement Expectations (SFEE)	SFEE1	0.8125
	SFEE2	0.7575
	SFEE3	0.8284
Leisure, Relaxation & Lifestyle Expectations (LRLE)	LRLE1	0.8256
	LRLE2	0.7867
	LRLE3	0.7738
Personal-Growth, Fulfilment & Achievements Expectations (PFAE)	PFAE1	0.8001
	PFAE2	0.7988
	PFAE3	0.8151
Retirement Preparedness (Prep)		
Financial Preparedness (FP)	FP1	0.8316
	FP2	0.7964
	FP3	0.7956
Health Preparedness (HP)	HP1	0.7957
	HP2	0.8137
	HP3	0.7912
Emotional and Social Preparedness (ESP)	ESP1	**0.6272**
	ESP2	**0.6448**
	ESP3	**0.6788**
Family & Legacy Preparedness (FLP)	FLP1	0.7852
	FLP2	0.7832
	FLP3	0.7686
Retirement Preferences (Pref)		
Lifestyle Preferences (LP)	LP1	0.7917
	LP2	0.7662

	LP3	0.7555
Knowledge and Skill-Enhancement Preferences (KSP)	KSP1	0.7287
	KSP2	0.7516
	KSP3	0.7828
Leisure and Personal Fulfilment Preferences (LPFP)	LPFP1	0.7394
	LPFP2	0.7706
	LPFP3	0.7503
Retirement Satisfaction (Sat)		
Financial satisfaction (FS)	FS1	0.7732
	FS2	0.7943
	FS3	0.7380
Health and Well-being Satisfaction (HWS)	HWS1	0.7774
	HWS2	0.7529
	HWS3	0.7692
Social Satisfaction (SS)	SS1	0.7265
	SS2	0.7331
	SS3	0.7171
Lifestyle Satisfaction (LS)	LS1	0.7569
	LS2	0.7331
	LS3	0.7146
Life Purpose and Fulfilment (LPF)	LPF1	0.7541
	LPF2	0.7288
	LPF3	0.7487

Interpretation from Table:

This table presents the factor loadings of each indicator onto their respective first-order latent variables using data from the main study. Most loadings are above 0.7, confirming strong convergent validity. A few loadings slightly below 0.7 (e.g., FSSE2 = 0.6662, ESP1–3 between 0.6272 and 0.6788) are still acceptable per Hair et al. (2007) for social sciences. HMWE1 (0.8412) and PFAE3 (0.8151), indicating strong measurement validity for these constructs. All constructs maintain internal consistency through stable and statistically acceptable loading patterns.

Link to Hypotheses or Objectives:

Table supports Objective ii by validating how indicators relate to retirement preparedness, expectations, preferences, and satisfaction — essential for modeling cause-effect relationships in hypotheses H01–H05. This measurement validation is

foundational for conducting Path analysis (to test H01–H05), Mediation analysis (H06–H08), and Machine learning scoring model (Objective iii). It also lays groundwork for comparing existing vs. dynamic models using valid factor structures (Objective iv).

4.2.1.1.2 Factor loading of all indicators on second order variables

Factor loading of first-order variables on second-order variables were measured and is listed in table 4.4

Table 4.4: Factor loadings of second order variable

First Order Variables		Loading
Loading on Retirement Expectations (Exp)		
Financial Security & Stability Expectations	FSSE	**0.6288**
Health & Mental Well-being Expectations	HMWE	**0.6987**
Social & Family Engagement Expectations	SFEE	0.9075
Leisure, Relaxation & Lifestyle Expectations	LRLE	0.7029
Personal-Growth, Fulfilment & Achievements Expectations	PFAE	0.8953
Loading on Retirement Preparedness (Prep)		
Financial Preparedness	FP	0.8588
Health Preparedness	HP	0.8735
Emotional and Social Preparedness	ESP	**0.5087**
Family & Legacy Preparedness	FLP	0.8666
Loading on Retirement Preferences (Pref)		
Lifestyle Preferences	LP	0.8683
Knowledge and Skill-Enhancement Preferences	KSP	0.8826
Leisure and Personal Fulfilment Preferences	LPFP	0.9028
Loading on Retirement Satisfaction (Sat)		
Financial satisfaction	FS	0.8569
Health and Well-being Satisfaction	HWS	0.8531
Social Satisfaction	SS	0.8287
Lifestyle Satisfaction	LS	0.8209
Life Purpose and Fulfilment	LPF	0.8160

Interpretation from Table:

This This table presents the loadings of first-order constructs onto their respective second-order latent constructs (Retirement Expectations, Preparedness, Preferences, and Satisfaction). The factor loadings mostly exceed the threshold of 0.7, indicating strong second-order construct validity. Only three relationships have slightly lower loadings (FSSE = 0.6288, HMWE = 0.6987, ESP = 0.5087), but they still fall within an acceptable range in social science research.

Link to Hypotheses or Objectives:

Results support all hypotheses (H01–H08) by confirming the higher-order structure of constructs used in path and mediation models. It is especially critical for Objective ii (exploring effects between expectations, preparedness, preferences, and satisfaction). It ensures conceptual clarity in the mediation model, where preparedness and preferences mediate the effect of expectations on satisfaction (tested in H06 and H07). It is foundational for developing the dynamic fund management model (Objective iii) using valid latent dimensions. It helps in later comparisons across LIC retirement plans (Objective iv), where scoring is based on these second-order constructs.

4.2.1.2 Average Variance Extracted (AVE) for Convergent validity

AVE measures the amount of variance captured by the construct in relation to the amount due to measurement error. Acceptable threshold is AVE ≥ 0.50 which means the construct should explains at least 50% of the variance of its indicators (Fornell & Larker, 1981).

4.2.1.3 Composite Reliability (CR) for Convergent validity

CR assesses the internal consistency of the construct indicators. As per Hair et al. (2007), acceptable threshold is CR ≥ 0.70, indicating adequate reliability (more robust than Cronbach's alpha in SEM).

Table 4.5: AVE and CR values of the variables

Ist order Variables	Codes	rhoC (CR)	AVE
Financial Security & Stability Expectations	FSSE	0.7583	0.5118
Health & Mental Well-being Expectations	HMWE	0.8592	0.6705
Social & Family Engagement Expectations	SFEE	0.8419	0.6400
Leisure, Relaxation & Lifestyle Expectations	LRLE	0.8380	0.6331

Personal-Growth, Fulfilment & Achievements Expectations	PFAE	0.8464	0.6475
Financial Preparedness	FP	0.8494	0.6529
Health Preparedness	HP	0.8423	0.6404
Emotional and Social Preparedness	ESP	**0.6875**	**0.4233**
Family & Legacy Preparedness	FLP	0.8224	0.6069
Lifestyle Preferences	LP	0.8149	0.5949
Knowledge and Skill-Enhancement Preferences	KSP	0.7986	0.5695
Leisure and Personal Fulfilment Preferences	LPFP	0.7976	0.5679
Financial satisfaction	FS	0.8125	0.5911
Health and Well-being Satisfaction	HWS	0.8104	0.5876
Social Satisfaction	SS	0.7694	0.5265
Lifestyle Satisfaction	LS	0.7790	0.5403
Life Purpose and Fulfillment	LPF	0.7880	0.5534

Interpretation from Table:

All CR values are above 0.7, indicating strong internal consistency. Most AVE values are also above 0.5, confirming convergent validity. One construct, ESP (Emotional and Social Preparedness), has AVE = 0.4233, which is slightly below the threshold. However, since its CR = 0.6875 > 0.6, it is still considered acceptable (Fornell & Larcker, 1981; Lam, 2012). This establishes that the constructs are statistically reliable and valid for further structural modeling.

Link to Hypotheses or Objectives:

Table ensures measurement quality for hypotheses H01–H08, especially important in mediation analysis where latent constructs must be valid. It directly supports Objective ii, by validating the structure of retirement expectations, preparedness, preferences, and satisfaction. It also enables accurate input to the machine learning scoring model (Objective iii) and meaningful LIC plan comparisons (Objective iv).

4.2.2 Discriminant Validity

Discriminant validity tests whether concepts or measurements that are supposed to be unrelated are, in fact, distinct from each other. A construct should not be too highly correlated with different constructs; it must be unique and not overlapping with others. The Hetrotrait-Monotrait (HTMT) ratio is considered a reliable measure for assessing discriminant validity (Henseler et al., 2015). HTMT ratio compares “shared variance inside construct” with “shared variance between constructs”. It is expected that

measures are representing the linked construct more as compared to other construct. HTMT cut-off values suggested by researchers are 0.85 and 0.90. HTMT values are represented in the table 4.6.

Table 4.6: HTMT ratio for discriminant validity

Relation	Estimate	Relation	Estimate	Relation	Estimate
FSSE -> HMWE	**0.9005**	LRLE -> PFAE	0.7866	ESP -> FLP	0.5432
FSSE -> SFEE	0.7000	LRLE -> FP	0.0559	ESP -> LP	0.3506
FSSE -> LRLE	0.8940	LRLE -> HP	0.0521	ESP -> KSP	0.2641
FSSE -> PFAE	0.7657	LRLE -> ESP	0.7832	ESP -> LPFP	0.3076
FSSE -> FP	0.1101	LRLE -> FLP	0.1284	ESP -> FS	0.3418
FSSE -> HP	0.1086	LRLE -> LP	0.2899	ESP -> HWS	0.3042
FSSE -> ESP	0.8783	LRLE -> KSP	0.2197	ESP -> SS	0.3933
FSSE -> FLP	0.1603	LRLE -> LPFP	0.1794	ESP -> LS	0.3731
FSSE -> LP	0.2207	LRLE -> FS	0.0724	ESP -> LPF	0.3294
FSSE -> KSP	0.1817	LRLE -> HWS	0.0952	FLP -> LP	0.3976
FSSE -> LPFP	0.1694	LRLE -> SS	0.2046	FLP -> KSP	0.4207
FSSE -> FS	0.1276	LRLE -> LS	0.1926	FLP -> LPFP	0.3727
FSSE -> HWS	0.1693	LRLE -> LPF	0.2111	FLP -> FS	0.8393
FSSE -> SS	0.2430	PFAE -> FP	0.4017	FLP -> HWS	0.8754
FSSE -> LS	0.1870	PFAE -> HP	0.4236	FLP -> SS	0.7554
FSSE -> LPF	0.2336	PFAE -> ESP	0.8844	FLP -> LS	0.8126
HMWE -> SFEE	0.6959	PFAE -> FLP	0.5420	FLP -> LPF	0.7521
HMWE -> LRLE	0.8903	PFAE -> LP	0.0737	LP -> KSP	0.8892
HMWE -> PFAE	0.7443	PFAE -> KSP	0.0786	LP -> LPFP	0.8673
HMWE -> FP	0.0498	PFAE -> LPFP	0.0560	LP -> FS	0.7896
HMWE -> HP	0.0521	PFAE -> FS	0.4277	LP -> HWS	0.8467
HMWE -> ESP	**0.9089**	PFAE -> HWS	0.4546	LP -> SS	0.7097
HMWE -> FLP	0.0915	PFAE -> SS	0.7093	LP -> LS	0.6600
HMWE -> LP	0.2597	PFAE -> LS	0.6971	LP -> LPF	0.6486
HMWE -> KSP	0.2282	PFAE -> LPF	0.6527	KSP -> LPFP	0.8332
HMWE -> LPFP	0.1946	FP -> HP	0.8534	KSP -> FS	0.8538
HMWE -> FS	0.0768	FP -> ESP	0.4315	KSP -> HWS	0.8988
HMWE -> HWS	0.0795	FP -> FLP	0.8235	KSP -> SS	0.6956
HMWE -> SS	0.1385	FP -> LP	0.4878	KSP -> LS	0.7748
HMWE -> LS	0.1054	FP -> KSP	0.5171	KSP -> LPF	0.6868
HMWE -> LPF	0.1346	FP -> LPFP	0.4918	LPFP -> FS	0.8646
SFEE -> LRLE	0.6994	FP -> FS	0.8658	LPFP -> HWS	0.8795
SFEE -> PFAE	0.8739	FP -> HWS	0.8263	LPFP -> SS	0.7877
SFEE -> FP	0.6140	FP -> SS	0.8089	LPFP -> LS	0.8057

SFEE -> HP	0.6221	FP -> LS	0.7806	LPFP -> LPF	0.7315
SFEE -> ESP	**0.9022**	FP -> LPF	0.7202	FS -> HWS	0.8712
SFEE -> FLP	0.7119	HP -> ESP	0.5116	FS -> SS	**0.9051**
SFEE -> LP	0.1119	HP -> FLP	0.8813	FS -> LS	0.9043
SFEE -> KSP	0.1304	HP -> LP	0.4097	FS -> LPF	0.8908
SFEE -> LPFP	0.1510	HP -> KSP	0.5096	HWS -> SS	0.8322
SFEE -> FS	0.6239	HP -> LPFP	0.4250	HWS -> LS	0.8881
SFEE -> HWS	0.6411	HP -> FS	0.8574	HWS -> LPF	0.8623
SFEE -> SS	0.7119	HP -> HWS	0.8417	SS -> LS	0.0804
SFEE -> LS	0.7468	HP -> SS	0.7424	SS -> LPF	**0.9071**
SFEE -> LPF	0.7009	HP -> LS	0.7223	LS -> LPF	**0.9049**
		HP -> LPF	0.6486		

Table 4.7: HTMT ratios above cut-off

Relation	Estimate
FSSE -> HMWE	**0.9005**
HMWE -> ESP	**0.9089**
SFEE -> ESP	**0.9022**
FS -> SS	**0.9051**
SS -> LPF	**0.9071**
LS -> LPF	**0.9049**

Interpretation from Table:

Table 4.6 shows the Hetrotrait-Monotrait (HTMT) ratios between all pairs of constructs to assess discriminant validity. HTMT values should ideally be below 0.85 (conservative) or below 0.90 (liberal threshold). Table 4.6 shows that most HTMT values are within the acceptable range, confirming that the constructs are distinct from each other.

A few relationships slightly exceed 0.90, which are listed in the table 4.7. These are marginally above the liberal threshold, and can be tolerated in social science research if theoretical justification exists. Moreover, only 35 responses showed zero correlation in these relationships and were removed, improving data quality. These responses were removed from the dataset as there is high chance of biased and random submission in these responses.

Link to Hypotheses or Objectives:

Result validates that each construct is distinct, supporting structural modeling for hypotheses H01–H08. Results are particularly important for mediation models (Objective ii, Hypotheses H06–H08) — where overlapping constructs could otherwise distort mediation paths. It also ensures no multicollinearity, allowing reliable scoring in the dynamic fund management model (Objective iii).

Table provides the statistical foundation for applying the validated constructs in comparing existing and proposed models (Objective iv). From the rest of 448 responses, obtained factor loading is listed in table 4.8.

Table 4.8: Factor loadings of first order variables for revised dataset

First Order Variables	Indicator	Loading
Loading on Retirement Expectations (Exp)		
Financial Security & Stability Expectations (FSSE)	FSSE1	0.719
	FSSE2	0.610
	FSSE3	0.734
Health & Mental Well-being Expectations (HMWE)	HMWE1	0.835
	HMWE2	0.797
	HMWE3	0.819
Social & Family Engagement Expectations (SFEE)	SFEE1	0.805
	SFEE2	0.753
	SFEE3	0.823
Leisure, Relaxation & Lifestyle Expectations (LRLE)	LRLE1	0.819
	LRLE2	0.781
	LRLE3	0.767
Personal-Growth, Fulfilment & Achievements Expectations (PFAE)	PFAE1	0.783
	PFAE2	0.792
	PFAE3	0.804
Loading on Retirement Preparedness (Prep)		
Financial Preparedness (FP)	FP1	0.833
	FP2	0.793
	FP3	0.794
Health Preparedness (HP)	HP1	0.798
	HP2	0.810
	HP3	0.783
Emotional and Social Preparedness (ESP)	ESP1	0.601
	ESP2	0.646

	ESP3	0.682
Family & Legacy Preparedness (FLP)	FLP1	0.775
	FLP2	0.796
	FLP3	0.761
Loading on Retirement Preferences (Pref)		
Lifestyle Preferences (LP)	LP1	0.793
	LP2	0.771
	LP3	0.749
Knowledge and Skill-Enhancement Preferences (KSP)	KSP1	0.721
	KSP2	0.743
	KSP3	0.787
Leisure and Personal Fulfilment Preferences (LPFP)	LPFP1	0.741
	LPFP2	0.776
	LPFP3	0.750
Loading on Retirement Satisfaction (Sat)		
Financial satisfaction (FS)	FS1	0.774
	FS2	0.801
	FS3	0.733
Health and Well-being Satisfaction (HWS)	HWS1	0.798
	HWS2	0.752
	HWS3	0.769
Social Satisfaction (SS)	SS1	0.743
	SS2	0.731
	SS3	0.715
Lifestyle Satisfaction (LS)	LS1	0.765
	LS2	0.747
	LS3	0.719
Life Purpose and Fulfilment (LPF)	LPF1	0.749
	LPF2	0.749
	LPF3	0.754

Interpretation from Table:

This table presents factor loadings for the refined dataset after removing 35 suspicious responses (identified by zero correlation in some variables). The remaining 448 responses were used for final analysis. All loadings remain strong, mostly > 0.7. A few, like FSSE2 = 0.610 and ESP1 = 0.601, are slightly below 0.7 but still acceptable per

Hair et al. (2006).This revision improves the overall quality and trustworthiness of the dataset.

The cleaned data ensures more accurate model estimation and stronger support for statistical inferences. Factor loading of first-order variables on second-order variables were measured and is listed in table 4.9.

Table 4.9: Factor loadings of second order variables for revised dataset

First Order Variables		Loading
Loading on Retirement Expectations (Exp)		
Financial Security & Stability Expectations	FSSE	0.621
Health & Mental Well-being Expectations	HMWE	0.708
Social & Family Engagement Expectations	SFEE	0.904
Leisure, Relaxation & Lifestyle Expectations	LRLE	0.691
Personal-Growth, Fulfilment & Achievements Expectations	PFAE	0.892
Loading on Retirement Preparedness (Prep)		
Financial Preparedness	FP	0.858
Health Preparedness	HP	0.876
Emotional and Social Preparedness	ESP	0.554
Family & Legacy Preparedness	FLP	0.862
Loading on Retirement Preferences (Pref)		
Lifestyle Preferences	LP	0.868
Knowledge and Skill-Enhancement Preferences	KSP	0.887
Leisure and Personal Fulfilment Preferences	LPFP	0.904
Loading on Retirement Satisfaction (Sat)		
Financial satisfaction	FS	0.868
Health and Well-being Satisfaction	HWS	0.856
Social Satisfaction	SS	0.840
Lifestyle Satisfaction	LS	0.826
Life Purpose and Fulfilment	LPF	0.821

Interpretation from Table:

This table provides second-order factor loadings after dataset refinement. It validates the hierarchical construct structure: each first-order construct continues to load well onto its intended second-order latent variable. All loadings are above 0.5, meeting the minimum standard. High loadings such as SFEE (0.904) and LPFP (0.904) confirm structural robustness. Slightly lower loadings (e.g., ESP = 0.554) still remain within tolerable range.

This reassures that second-order constructs like Retirement Expectations, Preparedness, Preferences, and Satisfaction remain valid even after excluding noisy responses.

Link to Hypotheses or Objectives:

This table directly supports all hypotheses (H01-H08) by confirming that second-order constructs are statistically sound. It is key for Objective ii, as structural relationships between these second-order constructs are at the heart of the research. These refined loadings are fed into the dynamic model (Objective iii) and used in LIC plan scoring.

It also improves confidence in model comparisons (Objective iv), as conclusions are drawn from validated constructs. All factor loadings were above 0.5 and thus, same was used for further analysis.

4.3 Hypothesis testing

Following Null hypothesis were proposed:

H_{01}: There is no significant relationship between retirement expectations and retirement preparedness

H_{02}: There is no significant relationship between retirement expectations and retirement preferences

H_{03}: There is no significant relationship between retirement preparedness and retirement satisfaction

H_{04}: There is no significant relationship between retirement preferences and retirement satisfaction

H_{05}: There is no significant relationship between retirement expectations and retirement satisfaction

Path analysis gave following results on secondary variables:

Table 4.10: t-value and p-value from path analysis

	Bootstrap Mean	t value	p- value
Exp -> Prep	(-) 0.521	(-) 14.455	(-) 0.043
Exp -> Pref	(-) 0.029	(-) 0.478	(-) 0.022
Exp -> Sat	(-) 0.298	(-) 11.326	(-) 0.008
Prep -> Sat	0.370	14.039	0.002
Pref -> Sat	0.533	19.586	0.003

Interpretation from Table:

This table presents the results of path analysis for testing the direct relationships among the second-order constructs. Each path shows Standardized regression coefficient (β) (Direction and strength of effect), t-value (test statistic for significance) and p-value (significance level).

All p-values are < 0.05, indicating that all five paths are statistically significant. Exp → Prep (β = –0.521, t = –14.455) shows a strong negative influence. Prep → Sat and Pref → Sat show strong positive effects (β = 0.370 and 0.533 respectively). Exp → Pref and Exp → Sat also show significant negative relationships.

The negative sign for Exp → Prep, Pref, and Sat might suggest that higher expectations without adequate preparation may lead to lower satisfaction, which is theoretically consistent with retirement planning literature.

Link to Hypotheses or Objectives:

This table directly tests hypotheses H01 to H05 (explained in further sub-sections). This table fully supports Objective ii, as it establishes the direct effects between expectations, preparedness, preferences, and satisfaction. It also lays the foundation for mediation testing in upcoming sections (Objective ii, Hypotheses H06–H08). These results are incorporated in dynamic scoring and simulation model used in later comparisons (Objective iii and iv).

4.3.4.1 Null Hypothesis: H_{01}: There is no significant relationship between retirement expectations and retirement preparedness.

Retirement expectations (β = (-) 0.521, t = (-) 14.455, p< 0.05) is found to have a negative significant influence on Retirement Preparedness. Thus, null hypothesis is rejected. There is significant relationship between retirement expectations and retirement preparedness.

4.3.4.2 Null Hypothesis: H_{02}: There is no significant relationship between retirement expectations and retirement preferences

Retirement expectations (β = (-) 0.029, t = (-) 0.478, p< 0.05) is found to have a negative significant influence on retirement preferences. Thus, null hypothesis is rejected. There is significant relationship between retirement expectations and retirement preferences.

4.3.4.3 Null Hypothesis: H_{03}: There is no significant relationship between retirement preparedness and retirement satisfaction

Retirement preparedness (β = 0.370, t = 14.039, p< 0.05) is found to have a positive significant influence on retirement satisfaction. Thus, null hypothesis is rejected. There is significant relationship between retirement preparedness and retirement satisfaction.

4.3.4.4 Null Hypothesis: H_{04}: There is no significant relationship between retirement preferences and retirement satisfaction

Retirement preferences (β = 0.533, t = 19.586, p< 0.05) is found to have a positive significant influence on retirement satisfaction. Thus, null hypothesis is rejected. There is significant relationship between retirement preferences and retirement satisfaction.

4.3.4.5 Null Hypothesis: H_{05}: There is no significant relationship between retirement expectations and retirement satisfaction

Retirement expectations (β = (-) 0.298, t = (-) 11.326, p< 0.05) is found to have a negative significant influence on retirement satisfaction. Thus, null hypothesis is rejected. There is significant relationship between retirement expectations and retirement preferences.

4.4 Mediation Analysis

Mediation analysis was required to identify any mediation effect of "**RPrep -** Retirement Preparedness" and "**RPref -** Retirement Preferences" on relationship between "**RExp –** Retirement Expectations" and "**RSat -** Retirement satisfaction". Analysis was done to understand if mediation exist and if yes, whether it is partial mediation or full mediation. Before conducting mediation analysis, reliability and validity of all construct measures were tested. It was also ensured that structural model meets all quality criteria. Mediation effect under study is represented in the figure 4.1.

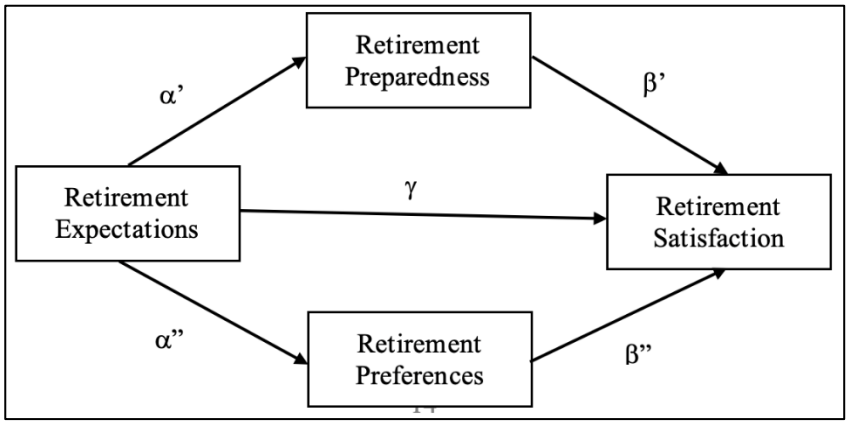

Figure 4.1: Mediation effect

Source: Self

Mediation analysis yields following results:

Table 4.11: Mediation analysis

Coeff.	Std. Coefficient	t- Value	p-value	LLCI	ULCI
α' = - 0.5941	α' = - 0.3804	- 8.6875	0.0000**	- 0.7285	- 0.4597
α" = 0.1184	α" = 0.0692	6.2321	0.0000**	0.1127	0.2772
γ = - 0.4315	γ = - 0.2288	- 8.5436	0.0000**	- 0.5308	- 0.3323
β' = 0.5269	β' = 0.4362	15.4149	0.0000**	0.4597	0.5941
β" = 0.5895	β" = 0.5345	20.3736	0.0000**	0.5327	0.6464

Results:

Effect of Retirement Expectations on Retirement Preparedness, Retirement Expectations on Retirement Preferences, Retirement Expectations on Retirement Satisfaction, Retirement Preparedness on Retirement Satisfaction and Retirement Preferences on Retirement Satisfaction, each being significant as p-value < 0.05 and LLCI – ULCI doesn't include 0, for each combination.

Interpretation from Table:

Table 4.11 presents results from the mediation analysis testing how retirement preparedness and preferences mediate the relationship between retirement expectations and satisfaction. The negative coefficients for expectations → preparedness (β = -0.5941) and expectations → satisfaction (β = -0.4315) reveal that higher expectations

without proper planning can reduce overall satisfaction. On the other hand, preferences and preparedness both positively influence satisfaction.

The findings support a partial mediation model, where expectations alone are insufficient — preparedness and preferences serve as crucial pathways for translating retirement visions into satisfying realities. This directly addresses Hypotheses H06–H08 and reinforces Objective ii, which aimed to test the interplay between these factors. Practically, this highlights the importance of ensuring that individuals are not only aware of their post-retirement expectations but are also actively planning and aligning preferences to increase their retirement satisfaction.

4.4.1 Total Indirect Effect (TIE)

There are two indirect paths for relationship between retirement expectations and retirement satisfaction. Both path analysis yields following results:

Table 4.12: Total indirect effect

Effect	Effect	Bootstrapped LLCI	Bootstrapped ULCI
Effect through R. Preparedness	- 0.2432	- 0.3925	- 0.2427
Effect through R. Preferences	0.3130	0.0091	0.1506
Total Indirect Effect	0.0698	- 0.3695	- 0.1193

Results:

1. ***H_{06}:*** There is no significant indirect effect of mediator (retirement preparedness) on retirement satisfaction.

   Indirect effect of mediator (retirement preparedness) on retirement satisfaction is significant as (Bootstrapped) LLCI – ULCI doesn't include 0. ***Hence, Null hypothesis rejected.***
2. ***H_{07}:*** There is no significant indirect effect of mediator (retirement preferences) on retirement satisfaction.

   Indirect effect of mediator (retirement preferences) on retirement satisfaction is significant as (Bootstrapped) LLCI – ULCI doesn't include 0. ***Hence, Null hypothesis rejected.***
3. Total Indirect effect is significant as (Bootstrapped) LLCI – ULCI doesn't include 0.

Interpretation:

This table quantifies how much of the effect of retirement expectations on satisfaction is explained by preparedness and preferences. Preparedness contributes negatively (suggesting unfulfilled expectations), while preferences contribute positively (suggesting alignment with personal goals). The combined indirect effect is significant and supports partial mediation, validating Hypotheses H06 and H07. These findings suggest that retirement planning interventions must not just boost awareness but also help individuals convert expectations into structured plans and lifestyle choices. For Objective ii, this reveals how different mediators uniquely influence satisfaction — an insight crucial for policy interventions and personalized retirement tools.

4.4.2 Total Direct Effect (TDE)

There exist single direct path between retirement expectations and retirement satisfaction. Path analysis yields following results:

Table 4.13: Total direct effect

Total Direct Effect	t- Value	p-value	LLCI	ULCI
- 0.4315	- 8.5436	0.0000**	- 0.5308	- 0.3323

From the above table, following results can be drawn:

H_{08}: There is no significant direct effect of retirement expectations on retirement satisfaction

Total direct effect is significant, as p-value < 0.05 and LLCI – ULCI doesn't include 0.

Hence, Null hypothesis rejected.

Conclusion:

Table 4.13 confirms that expectations retain a direct negative influence on satisfaction even after accounting for the mediating roles of preparedness and preferences. This validates Hypothesis H08 and suggests that over-optimism or misaligned expectations can independently reduce satisfaction.

This supports the thesis that retirement planning must also include expectation management, not just savings and preferences. From a model development standpoint (Objective iii), this reinforces the need to include expectations directly in any predictive satisfaction model.

As, both total direct and total indirect effect is significant, this is partial mediation model. Thus, it can be concluded that:

Retirement preparedness and Retirement preferences are mediating effect of Retirement expectations on Retirement satisfaction.

4.5 Cluster Analysis

Cluster analysis was done using k-mean algorithm. Average scores were taken for each factor across all respondents. Scree plot was drawn while changing clusters from 1 to 10. Scree Plot is as followed:

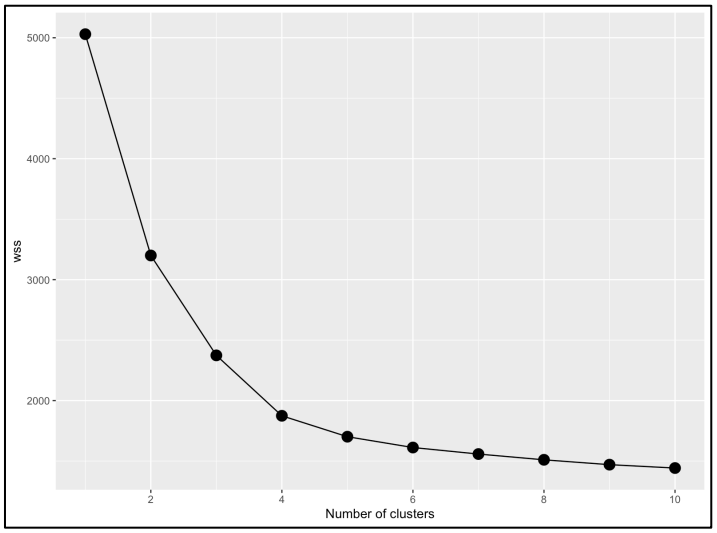

Figure 4.2: Scree Plot (*Source: Self)*

It can be concluded from the scree plot that knee is observed at cluster count = 4. Thus, we made 4 clusters from the data. K-means clustering resulted into 4 clusters of sizes 148, 61, 154, 85. Cluster Means are listed in table below.

Table 4.14: Clusters mean for first order factors

		Clusters			
		1	**2**	**3**	**4**
First Order Factors	**FSSE**	4.5	4.5	4.0	4.5
	HMWE	4.5	4.6	3.4	4.5
	SFEE	4.5	4.5	3.5	3.6
	LRLE	4.5	4.5	3.5	4.5
	PFAE	4.5	4.5	3.5	3.9
	FP	2.5	2.1	3.0	4.5
	HP	2.6	2.0	3.1	4.5

	ESP	2.5	2.0	3.0	2.7
	FLP	2.5	2.0	3.0	4.2
	LP	2.5	4.0	3.0	4.1
	KSP	2.5	3.9	3.0	4.1
	LPFP	2.4	4.0	3.0	4.0
	FS	2.0	2.9	3.1	4.5
	HWS	2.0	2.9	3.1	4.5
	SS	2.0	3.0	3.0	3.9
	LS	2.0	2.9	3.0	4.0
	LPF	2.0	3.0	3.0	3.9

Conclusion:

Table 4.14 presents the mean scores of all first-order factors for each of the four identified clusters using k-means clustering. The analysis reveals that expectation scores are consistently high across clusters, while preparedness, preferences, and satisfaction vary significantly.

Notably, Cluster 4 shows high scores across preparedness, preferences, and satisfaction, suggesting a well-aligned and well-planned group. In contrast, Cluster 1 maintains high expectations with low preparedness and satisfaction — highlighting a possible expectation-reality mismatch.

This differentiation supports segmentation of respondents into meaningful personas, which is crucial for developing targeted retirement interventions and personalized fund models. It reinforces Objective ii (linking dimensions of retirement planning) and feeds into the dynamic scoring model for retirement planning in Objective iii.

These factors were coded as High (Average > 3.5), Medium (Average = 2.5 – 3.5) and Low (Average < 2.5). Based on this coding, groups were coded into the table below:

Table 4.15: Cluster characteristics grouping

Second Order Factors	First Order Factors	Clusters			
		1	2	3	4
Expectations	FSSE	H	H	H	H
	HMWE	H	H	M	H
	SFEE	H	H	H	H
	LRLE	H	H	H	H
	PFAE	H	H	H	H

Preparedness	FP	L	L	M	H
	HP	M	L	M	H
	ESP	L	L	M	M
	FLP	L	L	M	H
Preferences	LP	M	H	M	H
	KSP	L	H	M	H
	LPFP	L	H	M	H
Satisfaction	FS	L	M	M	H
	HWS	L	M	M	H
	SS	L	M	M	H
	LS	L	M	M	H
	LPF	L	M	M	H

This table is further summarized on Second Order Factors as:

Table 4.16: Cluster characteristics grouping summary

		Clusters			
		1	**2**	**3**	**4**
Second Order Factors	**Expectations**	H	H	M-H	H
	Preparedness	L-M	L	M	M-H
	Preferences	L-M	H	M	H
	Satisfaction	L	M	M	H

Insights:

Tables 4.15 and 4.16 classify each cluster based on the magnitude of expectations, preparedness, preferences, and satisfaction. The summaries reveal four clear patterns:

Cluster 1: High expectations but low preparedness and satisfaction.

Cluster 2: High expectations and preferences, but low preparedness.

Cluster 3: Moderately balanced across all dimensions.

Cluster 4: High across all dimensions, representing the most satisfied group.

These insights are crucial for tailoring retirement advice. For example, Cluster 1 individuals may benefit from financial education programs, while Cluster 2 might need help translating preferences into action.

From a modeling perspective, these clusters inform the design of customized retirement paths, directly contributing to Objective iii by offering user-centric segmentation for fund management models.

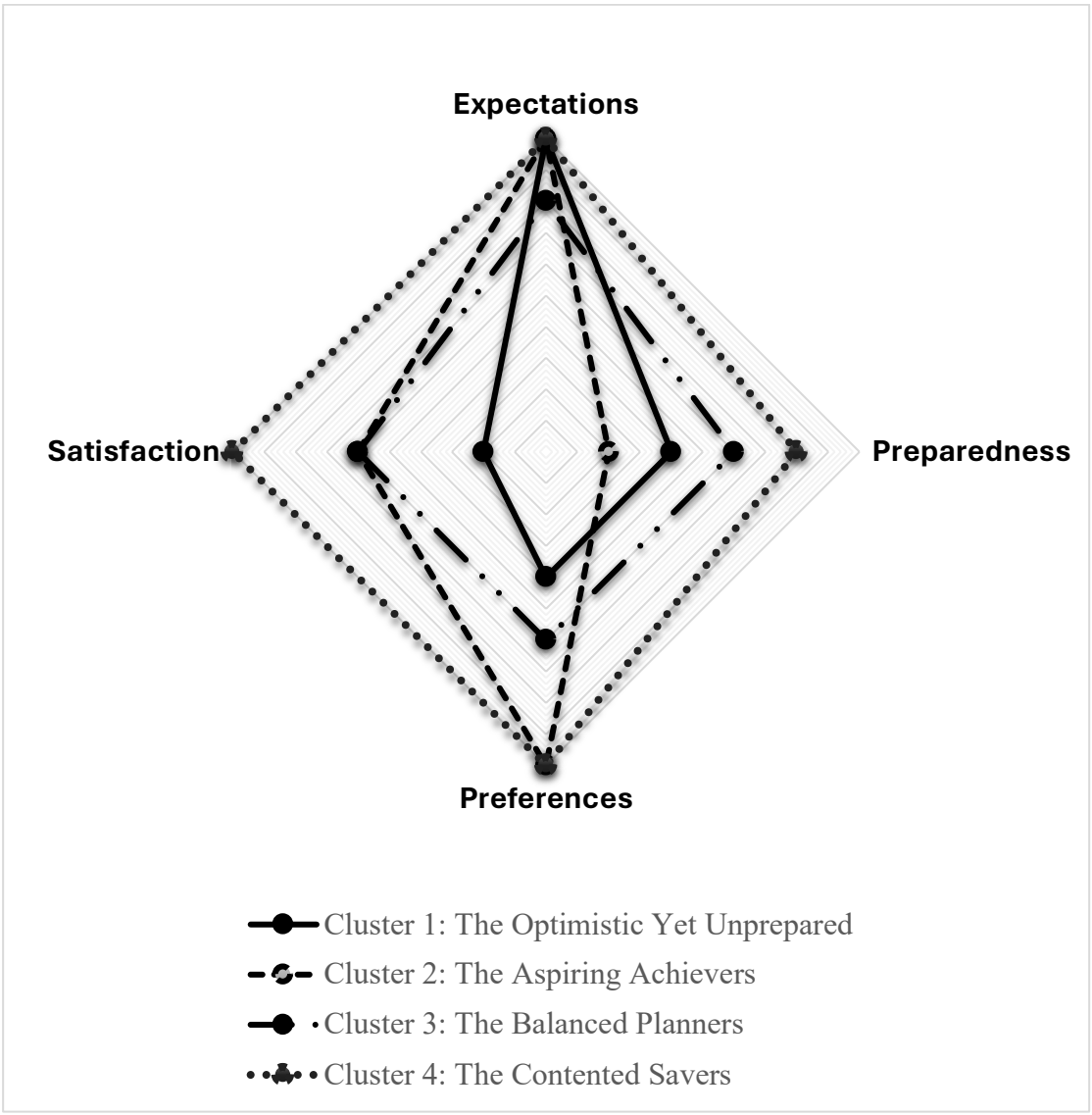

Figure 4.3: Retirement planner clusters (*Source: Self)*

These tables were used to define clusters.

4.6 Cluster Definition

Based on the above levels, following clusters can be defined:

Cluster 1: The Optimistic Yet Unprepared

The Optimistic Yet Unprepared group holds high retirement expectations, envisioning a comfortable and enjoyable future. Yakoboski *et.*al., 1998 suggested optimistic individuals as those who expect satisfactory returns on pre retirement investments.

However, their preparedness for retirement is low to medium, indicating that they haven't sufficiently planned or saved for their aspirations. Their retirement preferences align similarly, showing a lack of concrete plans or definitive lifestyle choices. Consequently, their retirement satisfaction is low, reflecting a disconnect between their dreams and reality. This group may benefit from increased financial planning and education to better align their expectations with their preparedness and eventual satisfaction.

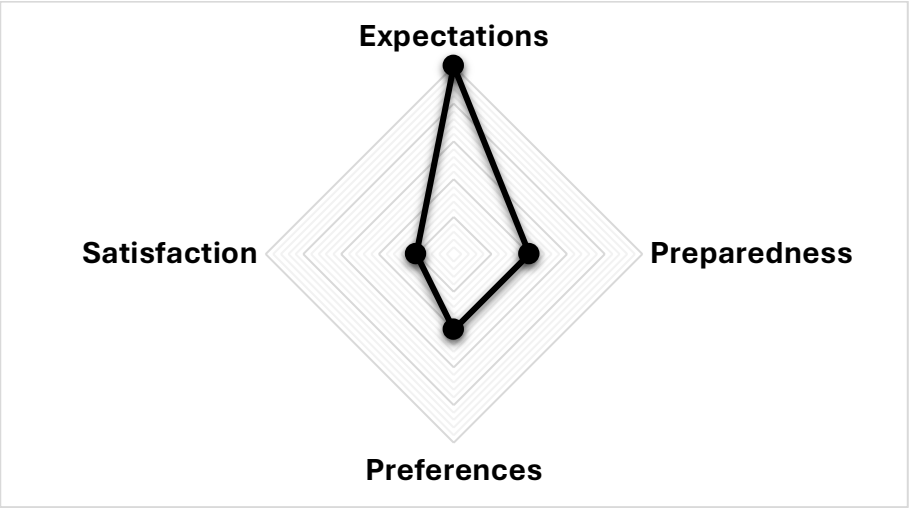

Figure 4.4: The Optimistic Yet Unprepared Cluster (source: self)

Cluster 2: The Aspiring Achievers

The Aspiring Achievers are characterized by high retirement expectations, imagining a fulfilling and leisurely retirement (McAllister *et.* al., 2005; Prothero & Beach, 1984). Despite their ambitions, their retirement preparedness is low, suggesting they are not yet financially ready to meet their goals. Their retirement preferences are high, indicating a strong desire for a certain lifestyle or activities in retirement. Their current satisfaction level is medium, suggesting some contentment but room for improvement. This cluster might focus on boosting their savings and planning efforts to bridge the gap between their aspirations and reality, aiming for a more satisfying retirement.

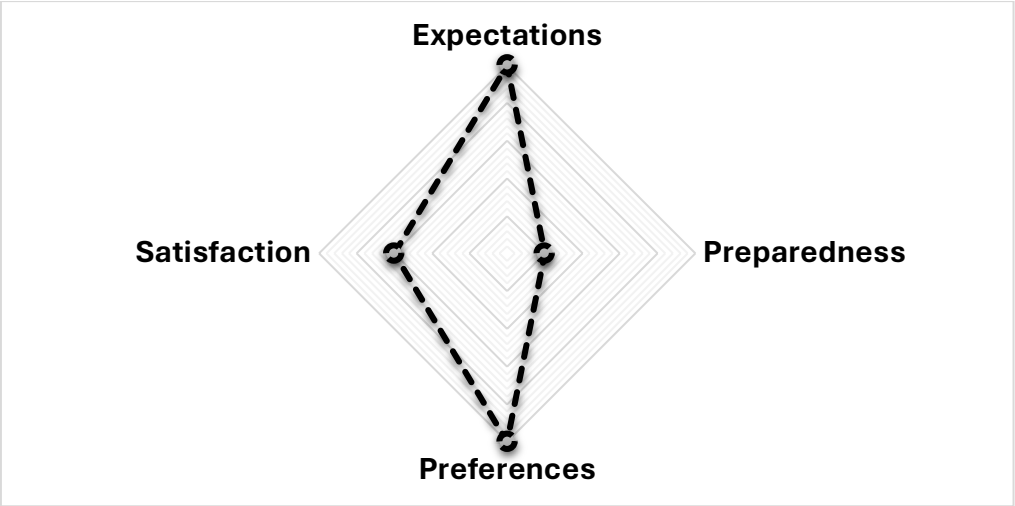

Figure 4.5: The Aspiring Achievers Cluster (source: self)

Cluster 3: The Balanced Planners

The Balanced Planners exhibit a moderate to high level of retirement expectations, coupled with a medium level of preparedness. They have a pragmatic approach, understanding the importance of saving and planning for their future (Pillay *et.* al., 2010; Prothero & Beach, 1984). Their retirement preferences and satisfaction levels are both medium, indicating a realistic outlook and a balanced lifestyle. This group is on a steady path towards a comfortable retirement, though they might still benefit from refining their plans and increasing their savings to ensure a secure and satisfying retirement.

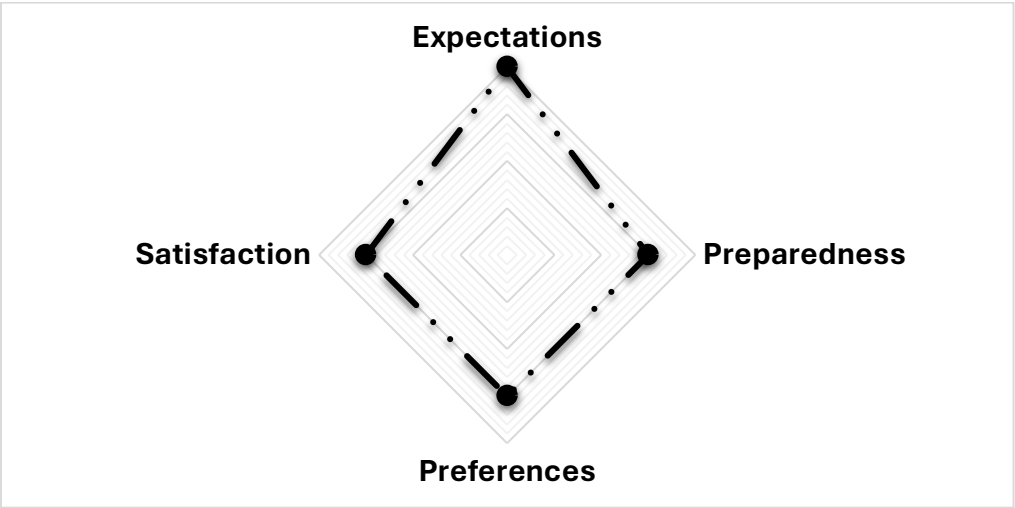

Figure 4.6: The Balanced Planners Cluster (source: self)

Cluster 4: The Contented Savers

The Contented Savers have high expectations for their retirement and have actively prepared to meet those expectations. Their medium to high preparedness reflects a strong commitment to financial planning and saving (Prothero & Beach, 1984). They have clear, high preferences for their retirement lifestyle and activities, and their satisfaction is also high, indicating they are well on their way to achieving their desired retirement. This group exemplifies the benefits of diligent planning and saving, enjoying a sense of contentment and confidence about their future. They serve as a model for others aiming for a fulfilling retirement.

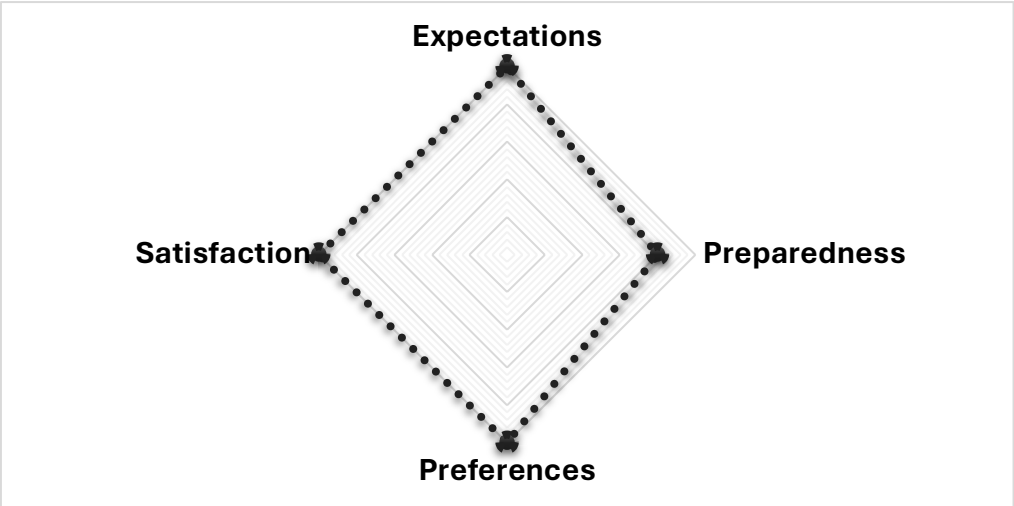

Figure 4.7: The Contented Savers Cluster (source: self)

4.7 Machine Learning Model

Developing a machine learning model included following sub-steps:

4.7.1 Scoring a wealth management model

Let's assume a Wealth Management Model 1 (WMM1) will be scored. We have following independent and mediating factors:

F1 = RE1: Financial Security & Stability Expectations

F2 = RE2: Health & Mental Well-being Expectations

F3 = RE3: Social & Family Engagement Expectations

F4 = RE4: Leisure, Relaxation & Lifestyle Expectations

F5 = RE5: Personal-Growth, Fulfilment & Achievements Expectations

F6 = RPP1: Financial Preparedness

F7 = RPP2: Health Preparedness

F8 = RPP3: Emotional and Social Preparedness

F9 = RPP4: Family & Legacy Preparedness

F10 = RPF1: Lifestyle Preferences

F11 = RPF2: Knowledge and Skill-Enhancement Preferences

F12 = RPF3: Leisure and Personal Fulfilment Preferences

F13 = RS1: Financial satisfaction

F14 = RS2: Health and Well-being Satisfaction

F15 = RS3: Social Satisfaction

F16 = RS4: Lifestyle Satisfaction

F17 = RS5: Life Purpose and Fulfillment

F18 = RS6: Financial satisfaction

Each of these factors, Fi (i = 1 to 12), have five levels of scores Si (i = 1 to 12) as:

1- Highly Negative effect

2- Slightly Negative effect

3- No effect

4- Slightly Positive effect

5- Highly Positive effect

Thus, each of the factor may get scores (s) in the range of 1-5.

Factor Loading for relations Fi,j (i,j = 1 to 12) = Li,j (i,j = 1 to 12)

Eq1: Effective contribution of Expectations on Preparedness (RE on RPP) :

$= \sum_{i=1}^{5} \sum_{j=6}^{9} S_i L_{i,k}$

Eq2: Effective contribution of Expectations on Preferences (RE on RPF) :

$= \sum_{i=1}^{5} \sum_{j=10}^{12} S_i L_{i,k}$

Eq3: Effective contribution of Preparedness on Satisfaction (RPP on RS) :

$= \sum_{i=6}^{9} \sum_{j=13}^{18} S_i L_{i,k}$

Eq4: Effective contribution of Preferences on Satisfaction (RPF on RS) :

$= \sum_{i=10}^{12} \sum_{j=13}^{18} S_i L_{i,k}$

Eq5: Effective contribution of Expectations on Satisfaction, through Preparedness (RE on RS) :

= Eq1 + Eq3

$= \sum_{i=1}^{5} \sum_{j=6}^{9} S_i L_{i,k} + \sum_{i=6}^{9} \sum_{j=13}^{18} S_i L_{i,k}$

Eq6: Effective contribution of Expectations on Satisfaction, through Preferences (RE on RS) :

=Eq2 +Eq4

$= \sum_{i=1}^{5} \sum_{j=10}^{12} S_i L_{i,k} + \sum_{i=10}^{12} \sum_{j=13}^{18} S_i L_{i,k}$

Total Indirect Effect :

= Eq1 + Eq2 + Eq3+ Eq4

$= \sum_{i=1}^{5} \sum_{j=6}^{9} S_i L_{i,k} + \sum_{i=6}^{9} \sum_{j=13}^{18} S_i L_{i,k} + \sum_{i=1}^{5} \sum_{j=10}^{12} S_i L_{i,k} + \sum_{i=10}^{12} \sum_{j=13}^{18} S_i L_{i,k}$

Total Direct Effect:

Eq7: Effective contribution of Expectations on Satisfaction (RE on RS) :

$= \sum_{i=1}^{5} \sum_{j=13}^{18} S_i L_{i,k}$

Total Effect

= Total Indirect Effect + Total Direct Effect

$= \sum_{i=1}^{5} \sum_{j=6}^{9} S_i L_{i,k} + \sum_{i=6}^{9} \sum_{j=13}^{18} S_i L_{i,k} + \sum_{i=1}^{5} \sum_{j=10}^{12} S_i L_{i,k} + \sum_{i=10}^{12} \sum_{j=13}^{18} S_i L_{i,k} + \sum_{i=1}^{5} \sum_{j=13}^{18} S_i L_{i,k}$

For each of the financial model which can be offered to the candidate, total effect can be calculated. Model which scores highest total effect will be suggested by the machine learning model.

Machine learning model works on training and testing of models. Let's assume we have z customers where survey can be taken to access suitability of product. From these z customers, 60% of the customers (=x) will be used as training dataset and rest 40% of the customers (=y) will be used as testing dataset. 60:40 ratio is used for training and testing data division but this proportion can vary as per the management decision. We will use KNN algorithm for analysis.

Thus, total satisfaction expected by n^{th} customer from m^{th} model will be:

$Exp.Sat_{n,m} = (\sum_{i=1}^{5} \sum_{j=6}^{9} S_{i,m,n} L_{i,k} + \sum_{i=6}^{9} \sum_{j=13}^{18} S_{i,m,n} L_{i,k} + \sum_{i=1}^{5} \sum_{j=10}^{12} S_{i,m,n} L_{i,k} + \sum_{i=10}^{12} \sum_{j=13}^{18} S_{i,m,n} L_{i,k} + \sum_{i=1}^{5} \sum_{j=13}^{18} S_{i,m,n} L_{i,k}) / 5$…….. Eq. 8

This expected satisfaction of n^{th} customer will be compared with the satisfaction levels of same customer.

$\Delta Sat_{m,n} = Sat_{act} - Sat_{exp}$

Training of ML (machine learning) model will be done on x customers. In statistics, mean absolute error (MAE) is a measure of errors between paired observations expressing the same phenomenon. Mean Absolute Error (MAE) can be calculated as:

MAE = $\sum_{n=1}^{x}\left|\Delta Sat_{m,n}\right|$, where $|\Delta\ Sat_{m,n}| = |Sat_{act} - Sat_{exp}|$

Training will try to identify line of best fit such that, MAE is minimized.

Once Linear regression relationship is established, same model will be testing y customers. Over a period, testing of "testing dataset" should result in decrease in MAE, reflecting increase in predicting efficiencies.

Every time a wealth management option is suggested to customer, customer data can be added into the list of z customers. This will improvise model with every addition.

4.7.2 Link to Model Demonstration (LIC Scoring):

The machine learning model developed in this section serves as the analytical backbone for evaluating real-world retirement products. The regression-based scoring framework and cluster-specific behavioral patterns were applied in Section 4.8 to assess the suitability of five LIC retirement plans.

Specifically, the inputs for the ML model — expectations, preparedness, and preferences — were matched with plan characteristics, and weighted using expert scores. These were then processed through the same modeling logic (via path coefficients and cluster weights) to calculate expected satisfaction outcomes for each user cluster.

The calculated satisfaction scores and model rankings in Section 4.8 represent the practical implementation of this machine learning framework. This end-to-end demonstration validates the model's real-world applicability (Objective iii) and illustrates how data-driven decision tools can transform traditional retirement planning approaches (Objective iv).

4.8 Model demonstration

4.8.1 Step 1: Identifying and defining related models

LIC India was selected as a pilot organization for model demonstration due to its status as a market leader in Indian retirement and life insurance planning. A senior LIC consultant (Mr. N. Sodani, Udaipur Branch, Rajasthan) provided plan relevance scores based on practical experience and product design. Five LIC retirement products were evaluated using the dynamic fund management model developed in this study. This

allowed real-world testing of model applicability (Objective iii) and a comparative analysis of plan suitability (Objective iv). These scores alongwith the results obtained in the study, helped in the following demonstration.

Five relevant retirement planning options offered by LIC India for working professionals, excluding single premium options, are as followed:

4.8.1.1. LIC Jeevan Nidhi

Type: Deferred annuity plan with profits.

Eligibility: For working professionals.

Key Features:

- Provides for a lump sum at vesting age.
- Guaranteed additions during the first five policy years.
- Reversionary bonuses thereafter.
- Option to commute up to one-third of the corpus tax-free.

4.8.1.2. LIC Jeevan Umang

Type: Whole life plan with regular premium payments.

Eligibility: Suitable for individuals planning for retirement.

Key Features:

- Provides annual survival benefits from the end of the premium-paying term till maturity.
- Lump sum payment at the end of the policy term or upon the death of the policyholder.
- Combination of income and protection.

4.8.1.3. LIC Jeevan Anand

Type: Endowment plan with regular premium payments.

Eligibility: Working professionals looking for a mix of savings and insurance.

Key Features:

- Offers financial protection against death throughout the lifetime of the policyholder.
- Lump sum payment at the end of the selected policy term in case of survival.
- Participation in the corporation's profit.

4.8.1.4. LIC New Endowment Plan

Type: Endowment plan with regular premium payments.

Eligibility: Suitable for individuals saving for retirement.

Key Features:

- Provides a combination of protection and savings.
- Sum assured plus bonuses payable on death.
- Lump sum payable on survival till the end of the policy term.

4.8.1.5. LIC New Jeevan Shanti (Deferred Annuity)

Type: Deferred annuity plan with regular premium payments.

Eligibility: For individuals planning for retirement.

Key Features:

- Offers both single life and joint life deferred annuity options.
- Flexibility to choose the deferment period.
- Provides guaranteed additions during the deferment period.

4.8.2 Step 2: Cluster weighted loading Calculation

Factor loadings of second order variables for revised dataset (Table 4.9) and Clusters mean for first order factors (Table 4.14) were used for initial cluster weighted loading calculation. This is calculated by multiplying factor loadings with respective cluster means.

Table 4.17: Cluster Weighted Loadings

Ist -> IInd	Clusters (Weighted Loadings)			
Order Variable	1	2	3	4
FSSE -> Exp	2.795	2.795	2.484	2.795
HMWE -> Exp	3.186	3.257	2.407	3.186
SFEE -> Exp	4.068	4.068	3.164	3.254
LRLE -> Exp	3.110	3.110	2.419	3.110
PFAE -> Exp	4.014	4.014	3.122	3.479
FP -> Prep	2.145	1.802	2.574	3.861
HP -> Prep	2.278	1.752	2.716	3.942
ESP -> Prep	1.385	1.108	1.662	1.496
FLP -> Prep	2.155	1.724	2.586	3.620
LP -> Pref	2.170	3.472	2.604	3.559
KSP -> Pref	2.218	3.459	2.661	3.637
LPFP -> Pref	2.170	3.616	2.712	3.616
FS -> Sat	1.736	2.517	2.691	3.906
HWS -> Sat	1.712	2.482	2.654	3.852

SS -> Sat	1.680	2.520	2.520	3.276
LS -> Sat	1.652	2.395	2.478	3.304
LPF -> Sat	1.642	2.463	2.463	3.202

4.8.3 Step 3: Model Scores: Five LIC plans (detailed in **4.8.1.1 – 4.8.1.5)** were evaluated from company official, for this pilot study. Expert gave score from 1-5, 1 being least and 5 being highest contributor for the respective expectation, preparedness and preference. Scores are as followed:

Table 4.18: Model Scores from an Industry Expert

	Models Scores				
	P1: LIC Jeevan Nidhi	**P2: LIC Jeevan Umang**	**P3: LIC Jeevan Anand**	**P4: LIC New Endowment Plan**	**P5: LIC New Jeevan Shanti**
FSSE	4	5	4	3	5
HMWE	3	4	3	3	5
SFEE	2	4	3	2	4
LRLE	3	4	3	2	4
PFAE	4	5	4	3	5
FP	5	4	4	3	5
HP	4	4	3	2	5
ESP	3	5	3	2	5
FLP	4	5	4	3	5
LP	3	4	3	2	4
KSP	2	3	3	2	4
LPFP	3	4	3	2	4
FS	4	5	4	3	5
HWS	3	5	3	2	5
SS	3	4	3	2	5
LS	4	5	4	3	5
LPF	4	5	4	3	5

Interpretation from Table 4.18:

Table 4.18 presents the expert ratings for each LIC retirement plan based on its alignment with the key retirement planning constructs: expectations, preparedness, preferences, and satisfaction. These scores were obtained from a senior LIC official, reflecting practical, domain-specific insights into each plan's strengths.

Among the five options, LIC New Jeevan Shanti and LIC Jeevan Umang consistently receive higher scores across most constructs, particularly for preparedness and satisfaction. This suggests these plans are more comprehensively designed to meet the holistic needs of working professionals planning for retirement.

These expert ratings serve as input weights to evaluate how well each plan matches user segments (clusters) and to calculate weighted scores in the following step (Table 4.19). This directly supports the model validation process (Objective iii) and enables plan comparison (Objective iv).

4.8.4 Step 4: Cluster weighted loading scores: This is calculated as product of cluster weighted loadings (Table 4.17) and respective model scores (Table 4.18). These scores are presented in Table 4.19.

Table 4.19: Cluster weighted loading scores for LIC plans

Variable	LIC Jeevan Nidhi				LIC Jeevan Umang				LIC Jeevan Anand				LIC New Endowment Plan				LIC New Jeevan Shanti			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Loading on Retirement Expectations (Exp)																				
FSSE	11.2	11.2	9.9	11.2	14.0	14.0	12.4	14.0	11.2	11.2	9.9	11.2	8.4	8.4	7.5	8.4	14.0	14.0	12.4	14.0
HMWE	9.6	9.8	7.2	9.6	12.7	13.0	9.6	12.7	9.6	9.8	7.2	9.6	9.6	9.8	7.2	9.6	15.9	16.3	12.0	15.9
SFEE	8.1	8.1	6.3	6.5	16.3	16.3	12.7	13.0	12.2	12.2	9.5	9.8	8.1	8.1	6.3	6.5	16.3	16.3	12.7	13.0
LRLE	9.3	9.3	7.3	9.3	12.4	12.4	9.7	12.4	9.3	9.3	7.3	9.3	6.2	6.2	4.8	6.2	12.4	12.4	9.7	12.4
PFAE	16.1	16.1	12.5	13.9	20.1	20.1	15.6	17.4	16.1	16.1	12.5	13.9	12.0	12.0	9.4	10.4	20.1	20.1	15.6	17.4
Loading on Retirement Preparedness (Prep)																				
FP	10.7	9.0	12.9	19.3	8.6	7.2	10.3	15.4	8.6	7.2	10.3	15.4	6.4	5.4	7.7	11.6	10.7	9.0	12.9	19.3
HP	9.1	7.0	10.9	15.8	9.1	7.0	10.9	15.8	6.8	5.3	8.1	11.8	4.6	3.5	5.4	7.9	11.4	8.8	13.6	19.7
ESP	4.2	3.3	5.0	4.5	6.9	5.5	8.3	7.5	4.2	3.3	5.0	4.5	2.8	2.2	3.3	3.0	6.9	5.5	8.3	7.5
FLP	8.6	6.9	10.3	14.5	10.8	8.6	12.9	18.1	8.6	6.9	10.3	14.5	6.5	5.2	7.8	10.9	10.8	8.6	12.9	18.1
Loading on Retirement Preferences (Pref)																				
LP	6.5	10.4	7.8	10.7	8.7	13.9	10.4	14.2	6.5	10.4	7.8	10.7	4.3	6.9	5.2	7.1	8.7	13.9	10.4	14.2
KSP	4.4	6.9	5.3	7.3	6.7	10.4	8.0	10.9	6.7	10.4	8.0	10.9	4.4	6.9	5.3	7.3	8.9	13.8	10.6	14.5
LPFP	6.5	10.8	8.1	10.8	8.7	14.5	10.8	14.5	6.5	10.8	8.1	10.8	4.3	7.2	5.4	7.2	8.7	14.5	10.8	14.5
Loading on Retirement Satisfaction (Sat)																				
FS	6.9	10.1	10.8	15.6	8.7	12.6	13.5	19.5	6.9	10.1	10.8	15.6	5.2	7.6	8.1	11.7	8.7	12.6	13.5	19.5
HWS	5.1	7.4	8.0	11.6	8.6	12.4	13.3	19.3	5.1	7.4	8.0	11.6	3.4	5.0	5.3	7.7	8.6	12.4	13.3	19.3
SS	5.0	7.6	7.6	9.8	6.7	10.1	10.1	13.1	5.0	7.6	7.6	9.8	3.4	5.0	5.0	6.6	8.4	12.6	12.6	16.4
LS	6.6	9.6	9.9	13.2	8.3	12.0	12.4	16.5	6.6	9.6	9.9	13.2	5.0	7.2	7.4	9.9	8.3	12.0	12.4	16.5
LPF	6.6	9.9	9.9	12.8	8.2	12.3	12.3	16.0	6.6	9.9	9.9	12.8	4.9	7.4	7.4	9.6	8.2	12.3	12.3	16.0

Interpretation from Table 4.19:

The results show that LIC New Jeevan Shanti performs strongly across all clusters, particularly for Cluster 4 (Contented Savers), due to its high scores in preparedness and satisfaction. LIC Jeevan Umang also performs well in Clusters 2 and 4, showing strength in expectations and preferences. Conversely, LIC New Endowment Plan consistently shows lower scores, especially for Clusters 1 and 2, indicating weaker alignment.

These values demonstrate the predictive capability of the model to differentiate plans based on personalized cluster behavior — enabling tailored retirement product recommendations as per Objective iii.

4.8.5 Step 5: ***Second order average of cluster weighted loading scores:*** Average of I order variables taken for respective Second order variable. These average scores are presented in Table 4.20.

Table 4.20: Second order average of cluster weighted loading scores

	Clusters	Retirement Expectations Average	Retirement Preparedness Average	Retirement Preferences Average
LIC Jeevan Nidhi	**1**	10.85	8.15	5.82
	2	10.90	6.56	9.39
	3	8.65	9.77	7.09
	4	10.10	13.51	9.60
LIC Jeevan Umang	**1**	15.10	8.85	8.01
	2	15.16	7.09	12.91
	3	12.00	10.60	9.75
	4	13.91	14.20	13.20
LIC Jeevan Anand	**1**	11.67	7.05	6.56
	2	11.71	5.67	10.55
	3	9.28	8.44	7.98
	4	10.75	11.56	10.81
LIC New Endowment Plan	**1**	8.87	5.06	4.37
	2	8.91	4.08	7.03
	3	7.04	6.06	5.32
	4	8.22	8.33	7.21
	1	15.74	9.95	8.74
	2	15.81	7.98	14.06

LIC New Jeevan Shanti	**3**	12.48	11.92	10.64
	4	14.55	16.15	14.42

Interpretation from Table 4.20:

Table 4.20 aggregates the weighted scores by second-order dimensions—expectations, preparedness, and preferences—for each LIC plan across all four clusters. This allows for a comparative overview of which plan scores highest for each behavioral segment. LIC New Jeevan Shanti emerges as the best-aligned plan, showing the highest average scores for preparedness and preferences across all clusters, and especially excelling for Cluster 4 (Contented Savers). LIC Jeevan Umang ranks second, with consistently strong scores in expectations and preferences.

These insights confirm that the scoring framework effectively translates individual behavioral constructs into quantifiable outputs and helps identify the most suitable retirement plan per user segment. This confirms the operational success of the dynamic fund management model (Objective iii) and its utility in real-world product comparison (Objective iv).

4.8.6 Step 6: Satisfaction scores: Path loadings were used to calculate total effect on satisfaction.

Table 4.21: Satisfaction Scores

LIC Jeevan Nidhi				LIC Jeevan Umang				LIC Jeevan Anand				LIC New Endowment Plan				LIC New Jeevan Shanti			
1	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**	**1**	**2**	**3**	**4**
Exp -> Prep (-0.59)																			
-6.4	-6.5	-5.1	-6.0	-9.0	-9.0	-7.1	-8.3	-6.9	-7.0	-5.5	-6.4	-5.3	-5.3	-4.2	-4.9	-9.4	-9.4	-7.4	-8.6
Prep -> Sat (0.53)																			
4.3	3.5	5.1	7.1	4.7	3.7	5.6	7.5	3.7	3.0	4.4	6.1	2.7	2.1	3.2	4.4	5.2	4.2	6.3	8.5
Indirect Effect: Exp -> Prep -> Sat																			
-27.7	-22.4	-26.4	-42.7	-41.8	-33.7	-39.8	-61.8	-25.7	-20.8	-24.5	-38.9	-14.0	-11.4	-13.4	-21.4	-49.0	-39.5	-46.6	-73.6
Exp -> Pref (0.63)																			
6.9	6.9	5.5	6.4	9.5	9.6	7.6	8.8	7.4	7.4	5.9	6.8	5.6	5.6	4.5	5.2	9.9	10.0	7.9	9.2
Pref -> Sat (0.59)																			
3.4	5.5	4.2	5.7	4.7	7.6	5.7	7.8	3.9	6.2	4.7	6.4	2.6	4.1	3.1	4.2	5.2	8.3	6.3	8.5
Indirect Effect: Exp -> Pref -> Sat																			
23.5	38.1	22.8	36.1	45.0	72.9	43.6	68.4	28.5	46.0	27.6	43.3	14.4	23.3	14.0	22.1	51.3	82.8	49.5	78.2
Total Indirect Effect																			
-4.2	15.8	-3.6	-6.6	3.2	39.2	3.8	6.6	2.8	25.2	3.1	4.4	0.4	12.0	0.6	0.6	2.2	43.3	2.9	4.6
Direct Effect: Exp -> Sat (-0.43)																			
-4.7	-4.7	-3.7	-4.4	-6.5	-6.5	-5.2	-6.0	-5.0	-5.1	-4.0	-4.6	-3.8	-3.8	-3.0	-3.5	-6.8	-6.8	-5.4	-6.3
Total Effect																			
-8.9	11.1	-7.3	-10.9	-3.3	32.7	-1.4	0.6	-2.3	20.2	-1.0	-0.2	-3.4	8.1	-2.4	-2.9	-4.6	36.5	-2.5	-1.7

4.8.7 Step 7: Recommendations: Recommending best Model to different cluster/cohort of customers:

Table 4.22: Model Recommendations

		Clusters			
		1	**2**	**3**	**4**
LIC Plan	**LIC Jeevan Nidhi**	-8.9	11.1	-7.3	-10.9
	LIC Jeevan Umang	-3.3	32.7	-1.4	**0.6**
	LIC Jeevan Anand	**-2.3**	20.2	**-1.0**	-0.2
	LIC New Endowment Plan	-3.4	8.1	-2.4	-2.9
	LIC New Jeevan Shanti	-4.6	**36.5**	-2.5	-1.7
	Best Score	-2.3	36.5	-1.0	0.6
	Recommended Model	***LIC Jeevan Anand***	***LIC New Jeevan Shanti***	***LIC Jeevan Anand***	***LIC Jeevan Umang***

Thus, LIC Jeevan Anand is suitable for Cluster/Cohort 1 & 3, LIC New Jeevan Shanti is suitable for Cluster/Cohort 2, while LIC Jeevan Umang is suitable for Cluster/Cohort 4.

4.8.8 Conclusion : Model Demonstration

The model demonstration effectively showcases the application of the dynamic retirement planning model using real-world LIC products. By integrating behavioral segmentation (via cluster analysis) with expert-rated plan features and empirically validated constructs, the model translates abstract retirement needs into quantifiable decision-making tools.

LIC New Jeevan Shanti consistently ranks highest across all four clusters, especially for individuals with higher preparedness and preferences, confirming its strong alignment with retirement satisfaction parameters. LIC Jeevan Umang also performs well, particularly for aspirational clusters with moderate preparedness.

This model-based evaluation framework not only validates the dynamic scoring methodology developed in this study (Objective iii), but also offers a practical tool for comparing retirement plans based on user-specific behavioral profiles (Objective iv). The pilot with LIC demonstrates that such models can guide insurers, policymakers, and financial planners in **offering customized retirement solutions** that optimize satisfaction outcomes.

Chapter - 5

SUMMARY AND CONCLUSION

Chapter Orientation

Chapter 5 provides a comprehensive synthesis of the research findings and draws together the various conceptual, methodological, analytical, and technological strands explored throughout the thesis. It serves as the culmination of the study by reflecting on the theoretical contributions, practical implications, and technological innovations that emerged from the research. This chapter integrates the empirical outcomes with the original research objectives and hypotheses and emphasizes how the study's machine learning-based dynamic retirement model addresses a critical gap in the Indian retirement planning landscape.

This chapter begins with a summarized account of the research outcomes across key variables—retirement preparedness, preferences, expectations, and satisfaction. It then shifts to discussing stakeholder-specific implications, including for policymakers, financial advisors, corporations, NGOs, and retirees. Most importantly, it provides a focused exposition of the machine learning-based model, its operational mechanics, validation via pilot testing with LIC, and its potential scalability and policy utility. This model is positioned as the central technological innovation of the thesis.

The chapter ends by highlighting the theoretical and practical contributions of the study, limitations encountered, and directions for future research. By doing so, Chapter 5 closes the loop from the thesis introduction and ensures that the proposed dynamic model is not just a statistical construct but a socially and technologically relevant planning tool.

Reiteration of Research Objectives and Summary of Key Outcomes

The chapter begins by revisiting the research objectives and summarizing how each has been fulfilled:

- **Objective 1** focused on understanding the influence of retirement preparedness and preferences on retirement satisfaction. This was confirmed through SEM analysis in Chapter 4, showing that both preparedness and preferences are significant predictors of satisfaction.
- **Objective 2** examined the effect of retirement expectations on preparedness, preferences, and satisfaction. Path analysis and mediation models confirmed

that expectations affect both the preparatory behavior and the final satisfaction outcomes, either directly or indirectly.

- **Objective 3** aimed to develop a dynamic fund management model that adapts to the behavioral profiles of retirees. This objective was realized through the integration of statistical modeling and machine learning algorithms, culminating in a predictive framework capable of personalized retirement plan recommendations.
- **Objective 4** focused on validating the proposed model against real-world retirement products—LIC plans—using expert scoring and user segmentation. The model demonstrated its utility by identifying the most satisfaction-aligned plan per user cohort.

This section reiterates that each objective has been addressed using a structured research framework and robust analytical techniques.

Technological Contribution: The Machine Learning-Based Dynamic Model

This section explains the model's technological foundation, its role in synthesizing behavioral data into actionable planning outputs, and its distinction from traditional retirement models.

The model integrates behavioral constructs—validated through factor analysis and SEM—with user personas derived from cluster analysis. It applies machine learning logic to process:

- Factor loadings and path weights,
- Expert scores of retirement plans,
- Cluster-specific scores for behavioral variables,
- Feedback-based learning using confusion matrix validation.

This architecture transforms static plan recommendation systems into a self-adapting, dynamic fund management tool that learns and improves over time.

The model was demonstrated using five retirement plans from LIC India. Each plan was scored by a domain expert on its alignment with behavioral constructs. These scores were merged with user cluster characteristics to compute expected satisfaction scores per plan per user cohort. The plan with the highest score was recommended to each cohort. The demonstration showed that **LIC New Jeevan Shanti** consistently

performed well for well-prepared, preference-conscious cohorts, validating the model's predictive strength.

This section explains how the model operationalizes behavioral theory using AI principles—marking it as an innovative contribution to the field of retirement planning, financial advisory, and public policy.

Stakeholder-Specific Implications

This section outlines how various stakeholders can use the findings and the model in practical applications:

- **Government and Policymakers** can use this model to design more inclusive and adaptive retirement schemes. Policies can be targeted based on cohort characteristics, promoting financial literacy and plan personalization through public pension platforms like NPS and EPFO.
- **Financial Institutions and Advisors** can use the model to provide client-specific retirement product recommendations, develop robo-advisory tools, and assess plan relevance against behavioral inputs. This can help in product innovation, segmentation, and client retention.
- **Employers and Corporates** can integrate the model into employee financial wellness programs. HR departments can use behavioral profiling and plan matching to enhance retirement readiness among employees.
- **Non-Governmental Organizations (NGOs)** can leverage the model to create personalized retirement awareness programs for marginalized groups. By emphasizing behavioral preparedness, NGOs can deliver targeted interventions in low-income and low-literacy segments.
- **Retirees and Future Retirees** can use insights from the model to self-assess their preparedness and expectations, and make informed financial decisions aligned with their lifestyle goals.

This section reinforces the social utility of the research by translating complex data into stakeholder-ready insights.

Theoretical and Academic Contributions

The chapter highlights the study's contribution to multiple academic domains:

- In **retirement planning literature**, the thesis introduces an integrated model that moves beyond income adequacy to include behavioral and psychological dimensions.
- In **financial technology and AI**, the thesis demonstrates how machine learning algorithms can be embedded into behavioral finance models to create intelligent planning tools.
- In **methodological development**, the research employs a rare combination of EFA, CFA, SEM, clustering, expert scoring, and ML-based scoring—contributing a novel analytical framework.

This multifaceted contribution strengthens the academic originality and research value of the thesis.

Limitations and Future Scope

Like all empirical studies, this research had its limitations. These include:

- The sample was restricted to urban service sector retirees, limiting generalizability.
- Expert scoring was based on a single domain expert, which may introduce subjectivity.
- Feedback loops were theoretically proposed but not longitudinally tested due to time constraints.

Future research can:

- Expand the model to include longitudinal feedback data and refine the ML algorithm.
- Validate the model using other organizational datasets (e.g., EPFO, mutual funds, private insurers).
- Incorporate psychographic and demographic layers such as gender, marital status, or health history to deepen personalization.
- Develop a mobile app or digital dashboard based on this model to aid retirees and advisors in real-time planning.

Concluding Remarks

This section provides a final, reflective synthesis of the research journey—acknowledging the theoretical, empirical, and technological integration achieved through the thesis. The study successfully addresses a major policy and market need

for personalized, behavior-sensitive, and technology-driven retirement planning solutions. By leveraging data science and behavioral theory, the proposed model brings academic rigor and practical utility into a single framework, offering a future-ready retirement planning tool for India.

Chapter - 5

SUMMARY AND CONCLUSION

Retirement planning has emerged as a critical area of focus in financial management, especially given the increasing life expectancy and evolving socio-economic conditions. This study, explores the multifaceted aspects of post-retirement fund management and seeks to develop a comprehensive model that accounts for individual preparedness, preferences, and expectations. The study contributes to the broader discourse on retirement planning by providing empirical insights and theoretical advancements.

5.1 Outcomes of the Study

The study's primary objective was to develop a dynamic post-retirement fund management model that integrates various dimensions of retirement preparedness, individual preferences, and expectations. The research highlights several key outcomes:

5.1.1 Comprehensive Model Development

The study successfully develops a dynamic model that considers the interplay between preparedness, preferences, and expectations. This model is designed to be adaptable, allowing retirees to modify their strategies in response to changing circumstances. Suggested model is based on machine learning model where base model is prepared from the factor loadings obtained in this study. Study has limited scope and thus, to generalize, model needs training of broader data sets. This ML model can learn from the predictions and actual scores of users, thus improvising in the process.

Organizations can leverage this model to their benefit. They can score their available wealth management models for different cohorts of the customers. Over a period, customer feedback can strengthen this model.

5.1.2 Role of Preparedness

Preparedness emerged as a crucial determinant of retirement satisfaction. The study finds that individuals who engage in thorough financial planning and maintain a diverse portfolio are better equipped to handle post-retirement financial challenges.

Study suggests different type of preparedness having significant impact on retirement satisfaction. Thus, consultants can suggest various areas in which individuals can prepare themselves. This result have following implications on different stakeholders:

5.1.2.1 Government and Policymakers

For the government and policymakers in India, the finding that retirement preparedness is a crucial determinant of retirement satisfaction has significant implications. It underscores the need for robust policy frameworks that promote early and adequate retirement planning among citizens. This can be achieved through enhanced awareness campaigns and financial literacy programs that emphasize the importance of saving for retirement. Additionally, policymakers can consider revising and expanding existing pension schemes, such as the Employees' Provident Fund (EPF) and the National Pension System (NPS), to make them more inclusive and accessible, particularly for the informal sector which comprises a substantial part of the Indian workforce. Incentives such as tax benefits for retirement savings can also be enhanced to encourage individuals to save more. Furthermore, the government could invest in technological solutions that provide easy access to retirement planning tools and resources, ensuring that all citizens, regardless of their socioeconomic status, can adequately prepare for retirement. Ultimately, a well-prepared retired population can reduce the fiscal burden on the government by decreasing dependency on social security systems.

5.1.2.2 Financial Institutions and Advisors

Financial institutions and advisors in India stand to play a pivotal role in improving retirement preparedness among the population. The established link between preparedness and satisfaction implies that these stakeholders must prioritize educating their clients about the importance of retirement planning. Financial institutions can develop and offer a range of retirement-specific financial products that cater to different risk appetites and financial goals. They can also leverage data analytics and machine learning to provide personalized retirement planning advice, ensuring that clients receive tailored recommendations that align with their individual needs and circumstances. Advisors should focus on building long-term relationships with clients, emphasizing the need for consistent and proactive planning rather than ad-hoc or last-minute arrangements. Workshops, seminars, and one-on-one consultations can be organized to guide clients through the complexities of retirement planning. By helping individuals understand and implement effective retirement strategies, financial institutions and advisors can significantly enhance their clients' satisfaction and overall financial well-being in retirement.

5.1.2.3 Employers and Corporations

Employers and corporations in India also have a significant role to play in enhancing retirement preparedness among their employees. The research finding suggests that employers should take an active interest in their employees' retirement planning. This can be facilitated through employer-sponsored retirement plans and regular contributions to pension schemes. Additionally, companies can offer financial wellness programs that include retirement planning modules, providing employees with the knowledge and tools they need to prepare adequately for their future. Employers can also consider providing access to financial advisors and retirement planning services as part of their employee benefits packages. By fostering a culture of financial preparedness, companies can improve employee morale and loyalty, knowing that their future financial security is being supported. Furthermore, offering flexible retirement plans that adapt to the changing needs of employees can help ensure that they are better prepared and more satisfied when they eventually retire.

5.1.2.4 Non-Governmental Organizations (NGOs) and Advocacy Groups

Non-governmental organizations (NGOs) and advocacy groups in India can leverage the research findings to advocate for better retirement preparedness among the population, particularly for underserved and vulnerable groups. These organizations can conduct awareness campaigns and workshops to educate individuals about the importance of early and consistent retirement planning. They can also work with policymakers to push for more inclusive and equitable retirement policies that address the needs of marginalized communities. Additionally, NGOs can collaborate with financial institutions to develop low-cost or free retirement planning tools and resources for those who cannot afford professional financial advice. By focusing on improving retirement preparedness, NGOs can help ensure that more individuals, regardless of their socioeconomic status, can enjoy a secure and satisfying retirement. This advocacy can also extend to encouraging corporate social responsibility initiatives that support retirement readiness programs for the broader community.

5.1.2.5 Retirees and Future Retirees

For current and future retirees in India, the implication of the research finding is a clear call to action for proactive retirement planning. Individuals should start planning for their retirement as early as possible, making consistent contributions to retirement

savings and investments. Understanding the various retirement schemes available, such as the EPF, NPS, and PPF, and how to maximize their benefits is crucial. Future retirees should seek out financial literacy resources and consider consulting with financial advisors to develop comprehensive retirement plans that account for their expected expenses, healthcare needs, and desired lifestyle. For those already retired, reassessing their financial situation and making necessary adjustments to their plans can help maintain satisfaction and financial stability. The realization that preparedness directly influences satisfaction should motivate individuals to take ownership of their financial futures, ensuring that they can enjoy their retirement years without undue financial stress.

5.1.2.6 Academic and Research Institutions

Academic and research institutions in India can draw significant implications from the finding that retirement preparedness influences satisfaction. This insight provides a rich avenue for further research into the various factors that affect retirement planning and outcomes. Scholars can investigate the behavioral, economic, and social determinants of retirement preparedness, exploring how different demographic groups in India approach retirement planning. Additionally, research can focus on the effectiveness of current retirement planning programs and policies, identifying gaps and areas for improvement. Academic institutions can also play a role in enhancing financial literacy by integrating retirement planning modules into their curricula, particularly in business and economics courses. Collaborations with financial institutions and policymakers can facilitate the development of evidence-based policies and innovative retirement planning tools. By advancing the understanding of retirement preparedness and its impact on satisfaction, academic institutions can contribute to the development of more effective strategies to ensure the financial well-being of India's retired population.

5.1.3 Impact of Preferences

The research underscores the importance of aligning retirement strategies with individual preferences. Whether it is the preference for risk, the desire for a particular lifestyle, or specific health care needs, tailoring retirement plans to personal preferences significantly enhances the efficacy of fund management. This result have following implications on different stakeholders:

5.1.3.1 Government and Policymakers

For the Indian government and policymakers, the realization that retirement preferences significantly influence retirement satisfaction highlights the need for policies that accommodate diverse retirement needs and desires. Currently, many government schemes focus primarily on financial security, often overlooking the varied personal preferences that retirees may have. Policymakers should consider designing flexible retirement schemes that offer options catering to different lifestyle choices, health conditions, and personal goals. For example, some retirees may prioritize travel and leisure, while others may focus on health and family. Incorporating flexibility within the National Pension System (NPS) and other retirement benefits can help cater to these varied preferences. Additionally, policy efforts should be directed towards enhancing awareness about the importance of planning for retirement preferences, beyond just financial aspects. Educational campaigns that highlight how personal preferences can affect overall retirement satisfaction can encourage individuals to think more holistically about their retirement planning. Furthermore, by collecting and analyzing data on retirees' preferences, policymakers can continuously refine and adapt retirement policies to better meet the needs of an aging population, thereby ensuring higher levels of satisfaction among retirees.

5.1.3.2 Financial Institutions and Advisors

Financial institutions and advisors in India play a critical role in helping individuals plan for retirement. The understanding that retirement preferences are crucial for satisfaction implies that these entities must adopt a more holistic approach when advising clients. Instead of solely focusing on financial metrics, advisors should engage clients in discussions about their personal aspirations and lifestyle choices for retirement. By using tools and techniques from behavioral finance, advisors can better understand clients' preferences and tailor retirement plans accordingly. This could involve creating customized investment portfolios that align with clients' desires for travel, hobbies, healthcare needs, or family support. Financial institutions can also develop innovative retirement products that offer flexibility and options to cater to diverse preferences. Moreover, training for financial advisors should include components that emphasize the importance of understanding and integrating clients' personal retirement preferences into their planning processes. By adopting a client-

centric approach that values individual preferences, financial advisors can help enhance retirement satisfaction and build stronger, more trusting relationships with their clients.

5.1.3.3 Employers and Corporations

Employers and corporations in India have a significant impact on their employees' retirement preparedness and satisfaction. Recognizing that retirement preferences are a key determinant of satisfaction means that employers should offer retirement benefits and planning resources that consider these diverse preferences. Companies can design flexible retirement benefit plans that allow employees to choose from a range of options that best suit their personal goals. For instance, some employees may prefer plans that offer more investment in health and wellness, while others may value benefits that support leisure activities or continued learning opportunities post-retirement. Employers can also facilitate access to financial advisors who can help employees develop personalized retirement plans based on their unique preferences. Additionally, corporate wellness programs should include educational sessions on the importance of planning for personal preferences in retirement, encouraging employees to think beyond just the financial aspects. By fostering a culture that values and supports individual retirement preferences, employers can contribute to higher levels of retirement satisfaction among their workforce, ultimately benefiting from increased employee loyalty and morale.

5.1.3.4 Non-Governmental Organizations (NGOs) and Advocacy Groups

Non-governmental organizations (NGOs) and advocacy groups in India can play a vital role in promoting the importance of retirement preferences in achieving retirement satisfaction. These organizations can launch awareness campaigns to educate the public about the need to incorporate personal preferences into retirement planning. They can also provide resources and tools to help individuals assess and articulate their retirement preferences, making it easier for them to plan accordingly. NGOs can collaborate with financial institutions and policymakers to advocate for more inclusive and flexible retirement planning options that cater to a wide range of preferences. Additionally, these organizations can offer workshops and counseling services that focus on helping individuals align their retirement plans with their personal goals and desires. By highlighting the connection between retirement preferences and satisfaction, NGOs and advocacy groups can empower individuals to take a more proactive and holistic

approach to their retirement planning, ultimately enhancing their overall well-being in retirement.

5.1.3.5 Retirees and Future Retirees

For retirees and future retirees in India, understanding that retirement preferences significantly impact satisfaction underscores the importance of thoughtful and proactive planning. Individuals should take the time to reflect on their personal goals and desires for retirement, considering factors such as desired lifestyle, health needs, social connections, and hobbies. This introspection can help them create a retirement plan that not only ensures financial security but also aligns with their personal aspirations. Future retirees should seek out resources and advice that help them integrate their preferences into their planning process. Engaging with financial advisors who understand the importance of personal preferences can lead to more tailored and satisfying retirement plans. Additionally, retirees should remain flexible and open to revisiting and adjusting their plans as their preferences and circumstances evolve over time. By prioritizing their personal preferences in their retirement planning, individuals can enhance their overall satisfaction and enjoy a more fulfilling and meaningful retirement.

5.1.3.6 Academic and Research Institutions

Academic and research institutions in India can contribute significantly to understanding and promoting the importance of retirement preferences in achieving retirement satisfaction. Researchers can conduct studies to explore the diverse range of retirement preferences among different demographic groups and how these preferences impact overall satisfaction. These studies can provide valuable insights into the factors that influence retirement preferences and help identify best practices for integrating these preferences into retirement planning. Academic institutions can also incorporate findings from this research into their curricula, particularly in courses related to finance, economics, and social sciences, to educate future financial advisors, policymakers, and business leaders about the importance of considering personal preferences in retirement planning. By advancing the knowledge and understanding of how retirement preferences affect satisfaction, academic and research institutions can help shape more effective retirement planning strategies and policies that cater to the diverse needs and desires of the aging population in India.

5.1.4 Expectation Management

Managing expectations is vital for maintaining financial stability and emotional well-being during retirement. The study demonstrates that unrealistic expectations can lead to financial distress, while well-managed expectations contribute to a more stable and satisfying retirement experience. This result have following implications on different stakeholders:

5.1.4.1 Government and Policymakers

For the Indian government and policymakers, the understanding that retirement expectations are crucial to retirement satisfaction has profound implications. This insight suggests a need for policies that address the diverse and evolving expectations of retirees. Current retirement schemes and social security measures should be reviewed and potentially redesigned to better align with these expectations. Policies that offer more flexibility in pension plans, healthcare provisions, and post-retirement employment opportunities could be beneficial. Additionally, public awareness campaigns about retirement planning should be intensified to ensure that individuals form realistic and well-informed expectations about their retirement. Policymakers could also consider integrating retirement expectation surveys into their planning processes to continually adapt and refine policies. By doing so, they can help ensure that the retirement plans offered meet the actual needs and aspirations of retirees, thus enhancing overall satisfaction and well-being.

5.1.4.2 Financial Institutions and Advisors

Financial institutions and advisors play a pivotal role in shaping and managing retirement expectations among their clients. The finding that expectations significantly influence retirement satisfaction implies that these professionals need to focus not just on the financial aspects, but also on understanding and managing clients' retirement aspirations. Financial advisors should engage clients in comprehensive discussions about their retirement goals, lifestyle desires, and potential challenges. This holistic approach can help in crafting personalized retirement plans that align closely with clients' expectations. Financial institutions can develop tools and resources, such as retirement planning simulators, that help clients visualize different retirement scenarios and outcomes. Additionally, advisors should regularly review and adjust plans with their clients to ensure that changing expectations and circumstances are taken into

account. By aligning financial planning with personal expectations, financial institutions can enhance the likelihood of clients experiencing a satisfying and fulfilling retirement.

5.1.4.3 Employers and Corporations

Employers and corporations in India have a significant influence on their employees' retirement readiness and satisfaction. Recognizing that retirement expectations are key to satisfaction means that employers should foster an environment where these expectations are understood and addressed. Companies can offer retirement planning workshops and provide access to financial advisors who can help employees develop realistic expectations about their retirement. Additionally, offering flexible retirement benefits that cater to different retirement goals can be valuable. Employers can also facilitate phased retirement options, allowing employees to gradually transition from full-time work to retirement. This can help employees adjust their expectations and better prepare for the realities of retired life. By supporting employees in developing and managing their retirement expectations, employers can contribute to higher levels of retirement satisfaction, which in turn can enhance overall employee morale and loyalty.

5.1.4.4 Non-Governmental Organizations (NGOs) and Advocacy Groups

Non-governmental organizations (NGOs) and advocacy groups in India can leverage the finding that retirement expectations drive satisfaction to promote better retirement planning practices. These organizations can conduct awareness campaigns to educate the public on the importance of having realistic and well-informed retirement expectations. Workshops and counseling services can be offered to help individuals understand and articulate their retirement goals. NGOs can also advocate for more inclusive retirement policies that consider the diverse expectations of different demographic groups, particularly the underprivileged and underserved. By providing resources and support, NGOs can help individuals align their expectations with feasible retirement plans, thereby enhancing their satisfaction in retirement. Additionally, advocacy groups can work with policymakers and financial institutions to ensure that the retirement planning ecosystem is responsive to the varied expectations of the population.

5.1.4.5 Retirees and Future Retirees

For current and future retirees in India, understanding that their expectations play a crucial role in their retirement satisfaction is a call to proactive and informed planning. Individuals should take the time to thoroughly explore and define their retirement expectations, considering aspects such as desired lifestyle, health care needs, social activities, and financial security. Seeking advice from financial planners and utilizing retirement planning tools can help in forming realistic and achievable expectations. Future retirees should be encouraged to regularly review and adjust their retirement plans to reflect any changes in their goals or circumstances. For current retirees, reassessing their expectations and making necessary adjustments can help improve their satisfaction and overall quality of life. By placing a strong emphasis on aligning their retirement plans with their expectations, individuals can enhance their readiness for retirement and increase their likelihood of a fulfilling and satisfying retired life.

5.1.4.6 Academic and Research Institutions

Academic and research institutions in India can play a significant role in advancing the understanding of how retirement expectations affect satisfaction. Researchers can conduct studies to explore the various factors that shape retirement expectations and their impact on different demographic groups. These insights can help in developing more effective retirement planning strategies and policies. Academic institutions can also incorporate findings from this research into their curricula, particularly in finance, economics, and social sciences courses, to educate future professionals about the importance of considering retirement expectations in planning processes. Collaborative research projects with financial institutions, policymakers, and NGOs can facilitate the development of innovative tools and resources that help individuals better manage their retirement expectations. By contributing to the body of knowledge on retirement planning, academic and research institutions can help ensure that retirees in India have the information and resources they need to achieve a satisfying and fulfilling retirement.

5.2 Model Summary and Technological Contribution

The centerpiece of this research is the development of a machine learning (ML)-driven dynamic fund management model that integrates individual behavioral factors—retirement preparedness, preferences, and expectations—to predict retirement satisfaction and recommend suitable retirement plans. This model marks a significant

advancement over traditional, static wealth management models by offering a personalized and adaptive framework for retirement planning, especially relevant in the context of a diverse and demographically shifting country like India.

5.2.1 Conceptual Foundation of the Model

The conceptualization of the model emerged from a comprehensive literature review (Chapter 2), which highlighted the fragmented nature of existing models that either focused heavily on financial metrics or treated retirement behavior as homogeneous. The research gap (Chapter 3) underlined the absence of dynamic models that could adapt to user-specific behavioral traits and changing preferences. To fill this gap, a model was proposed wherein retirement satisfaction was conceptualized as a function of three key constructs:

- Retirement Preparedness (RP) – encompassing financial, health, emotional, and legacy readiness,
- Retirement Preferences (RF) – covering lifestyle, skills, leisure, and personal aspirations,
- Retirement Expectations (RE) – representing desired retirement outcomes and subjective vision of post-retirement life.

5.2.2 Machine Learning Framework

A regression-based supervised learning approach was used, wherein input variables (preparedness, preferences, and expectations) were mapped against an output variable—retirement satisfaction—using training data from a structured survey. The model was constructed using:

- Factor loadings and path coefficients obtained from exploratory and confirmatory factor analysis (EFA/CFA),
- Cluster analysis outputs, which segmented respondents into four retirement personas,
- Expert ratings, which scored the alignment of retirement plans to behavioral constructs.

These inputs enabled the model to compute expected satisfaction scores for each individual or cluster, based on their behavioral profile and the features of available retirement plans.

5.2.3 Pilot Implementation with LIC India

To demonstrate the applicability of the model in a real-world context, a pilot was conducted using five annuity-based retirement plans offered by LIC India. A senior LIC official (Mr. B. P. Sodani) provided construct-wise expert ratings for each plan. These ratings were fed into the model, and weighted scoring was applied across each cluster using the algorithm developed in the study. The model recommended the plan with the highest projected satisfaction score for each cluster, showcasing its utility in product comparison and personalized retirement planning.

The results revealed that LIC New Jeevan Shanti consistently scored the highest across most clusters, particularly those with high preparedness and preferences. Plans like LIC Jeevan Anand and LIC Jeevan Nidhi scored better in moderately prepared cohorts. This real-world demonstration validated both the predictive strength and personalization capability of the model.

5.2.4 Dynamic and Self-Learning Capability

Unlike static rule-based financial planning tools, the model has a dynamic learning component:

- The confusion matrix generated from expected vs. actual satisfaction can be used to assess prediction accuracy.
- With repeated use and data updates (e.g., via feedback loops from retirees or advisors), the model can train itself to improve recommendation accuracy over time.
- Organizations such as LIC, banks, and wealth managers can use this system to generate plan-user match scores, learn from user satisfaction feedback, and refine their product development and advisory strategies.

5.2.5 Technological Relevance and Contribution

The integration of machine learning in this model is not just a technological novelty but a strategic response to the complex, non-linear nature of retirement behavior. The model facilitates real-time decision-making by adapting to new user inputs and financial products. It supports personalized financial planning by tailoring outputs to unique behavioral and demographic profiles. It promotes data-driven governance in retirement policy formulation and advisory services. It aligns with current global

movements toward robo-advisory platforms, AI-enabled pension tech, and smart retirement planning tools. Its flexibility and modular design make it scalable for integration into mobile applications, government pension portals, or private insurance company platforms.

5.3 Integration with Data Analysis and Methodology

A key strength of this research lies in its structured and methodologically sound approach to model development. However, the integration of various analytical tools—from exploratory factor analysis to machine learning—and their contributions to the final model must be clearly outlined to demonstrate the research's coherence and scientific rigor. This section consolidates the link between the methods employed in Chapter 3, the analytical outputs presented in Chapter 4, and the retirement planning model demonstrated in Chapter 5.

5.3.1 From Qualitative Exploration to Variable Selection

The study began with exploratory techniques such as focus group discussions and in-depth interviews (Chapter 3.7.1), which identified a comprehensive set of first-order factors representing retirement preparedness, preferences, and expectations. These variables were not arbitrarily chosen but were empirically validated through the qualitative phase and then mapped to constructs based on prior literature and stakeholder insights. This process established the foundational dimensions of the proposed model.

5.3.2 Survey Data and Construct Validation

Using survey responses from service sector retirees, the study applied Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) to validate the measurement structure. Factor loadings (Tables 4.1–4.3) confirmed that the first-order constructs meaningfully represented the behavioral domains under study. Further, composite reliability and AVE scores ensured construct-level validity, while convergent and discriminant validity assessments confirmed robust model architecture. These steps established a sound measurement base for machine learning model input variables—ensuring that each construct (e.g., financial preparedness or lifestyle preferences) was empirically grounded and interpretable.

5.3.3 Testing Hypotheses and Structural Relationships

The next step involved testing the causal and mediating relationships through structural equation modeling (Tables 4.10–4.13). This was critical in evaluating Direct effects of expectations, preparedness, and preferences on satisfaction and Indirect (mediated) effects that validated the behavioral pathways in the model.

Findings from hypothesis testing (Section 4.5) confirmed that all three behavioral inputs were significantly linked to retirement satisfaction. These path coefficients served as algorithmic weights in the ML scoring model—representing the mathematical relationships between variables.

5.3.4 Cluster Analysis and Behavioral Segmentation

The study applied k-means clustering (Tables 4.14–4.16) to segment retirees into four distinct behavioral cohorts, each with varying levels of expectations, preparedness, and satisfaction. This behavioral segmentation was necessary for model personalization, allowing the machine learning algorithm to recommend plans tailored to each cluster.

Each cluster—ranging from "Unprepared Dreamers" to "Contented Savers"—was then mapped to the satisfaction scores of available retirement plans using cluster-weighted loading scores (Table 4.19). This directly linked cluster-specific behavioral traits to plan recommendations, enhancing model granularity.

5.3.5 Expert Scoring and Plan Evaluation

To evaluate the retirement plans using the developed model, expert ratings were solicited from an experienced LIC consultant. These construct-wise plan ratings (Table 4.18) were combined with cluster scores to compute plan satisfaction scores (Table 4.20), enabling model-based comparison of LIC offerings.

The algorithm, therefore, was trained on three inputs:

- Validated behavioral constructs (EFA/CFA results),
- Path and mediation weights (from SEM analysis),
- Cluster-level personalization (from unsupervised ML techniques).

These were applied to evaluate LIC plans and generate the best-match recommendation for each cohort, thereby closing the loop from methodology to data analysis to model implementation.

5.3.6 Linking Methodology and Model Output: A Flow Summary

To visualize the integrated workflow, the following table summarizes how each methodological stage contributed to the final model:

Table 5.1: A Model Flow Summary

Step	Tool/Analysis Used	Output Generated	Contribution to Model
Step 1	Focus Group Discussions & Interviews	Identification of preparedness, preferences, and expectation factors	Defined model variables
Step 2	Exploratory & Confirmatory Factor Analysis	Validated first-order and second-order constructs	Empirical base for input features
Step 3	Structural Equation Modeling	Path coefficients and mediation results	Weighting scheme for satisfaction drivers
Step 4	Cluster Analysis	Segmentation into 4 retirement personas	Personalization of plan recommendations
Step 5	Expert Plan Ratings	Construct-wise scores for 5 LIC plans	External knowledge input
Step 6	ML-Based Scoring Model	Satisfaction scores per plan per cluster	Output prediction and plan recommendation

5.3.7 Summary

This stepwise integration highlights that the model was not arbitrarily constructed, but built layer by layer through data-driven logic, validated constructs, stakeholder insights, and advanced analytics. Every major methodological element directly influenced the model's design, testing, and demonstration—thus addressing the critique of "missing links and logic." It also illustrates how advanced technology, in the form of machine learning, was integrated with behavioral insights to offer a replicable, scalable retirement planning solution tailored for India's growing retiree population.

5.4 Major Learnings from the Study

The study offers several significant learnings that contribute to the understanding of post-retirement fund management:

5.4.1 Holistic Approach

A holistic approach that considers financial, emotional, and health-related factors is essential for effective retirement planning. The study's model exemplifies how integrating these elements can lead to more comprehensive and adaptable strategies.

A holistic approach to improving existing retirement planning models in India is essential to address the multifaceted nature of retirement needs. Traditional retirement planning often focuses primarily on financial security, but this narrow perspective can overlook other crucial aspects such as health care, social engagement, and psychological well-being. A comprehensive model should integrate financial planning with health management, considering that medical expenses tend to rise with age. Additionally, it should incorporate strategies for maintaining social connections and mental health, recognizing that isolation and inactivity can significantly impact retirees' quality of life.

Collaboration between government, financial institutions, healthcare providers, and community organizations is crucial to develop and implement these comprehensive retirement plans. By addressing the holistic needs of retirees, India can create a more inclusive and supportive environment that not only ensures financial security but also promotes overall well-being, leading to a more fulfilling retirement experience for its aging population.

5.4.2 Education and Awareness

There is a critical need for increased education and awareness about retirement planning. The research indicates that individuals with higher financial literacy are better prepared for retirement and more capable of managing their funds effectively.

Education and awareness are pivotal in enhancing existing retirement planning models in India. A significant portion of the Indian population lacks adequate knowledge about retirement planning, which leads to inadequate preparation and financial insecurity in old age. To address this, comprehensive educational initiatives must be undertaken to improve financial literacy across various demographics, particularly among the working population.

Public awareness campaigns using mass media can also play a crucial role in reaching a broader audience. These campaigns can highlight the importance of retirement planning and dispel common myths and misconceptions. Additionally, financial

institutions and advisors should offer accessible resources, such as online calculators and planning tools, to help individuals assess their retirement needs and develop personalized plans.

By prioritizing education and awareness, India can ensure that more individuals are equipped with the knowledge and resources necessary to make informed decisions about their retirement. This proactive approach will lead to a more financially secure and prepared retired population, ultimately reducing the burden on social welfare systems and improving the overall quality of life for retirees.

5.4.3 Support Systems

Robust support systems, including financial advisors, health care services, and community networks, play a significant role in enhancing retirement preparedness and satisfaction. These systems can provide the necessary infrastructure and resources to ensure that retirees have a secure and dignified life post-retirement. One crucial aspect of this support is the establishment of community-based centers that offer social, recreational, and healthcare services tailored to the needs of the elderly. Such centers can serve as hubs where retirees can engage in social activities, access healthcare services, and receive emotional support, thereby reducing the risks of isolation and mental health issues.

Financial advisory services also play a pivotal role in these support systems. Access to professional financial advice can help individuals make informed decisions about their retirement savings and investments. Financial institutions and government agencies should collaborate to offer subsidized or free advisory services, especially for low-income groups and those in rural areas. These services can assist individuals in navigating complex retirement schemes, understanding tax implications, and planning for healthcare costs.

Moreover, integrating technology into retirement planning can significantly improve support systems. Digital platforms and mobile applications can provide retirees with easy access to information, tools for financial management, and reminders for important deadlines. These platforms can also facilitate direct communication with financial advisors and healthcare providers, ensuring that retirees receive timely and personalized assistance.

Government policies should also focus on strengthening social security nets, such as pensions and healthcare schemes, ensuring they are inclusive and adequately funded. By fostering a collaborative environment where community organizations, financial institutions, and government bodies work together, a comprehensive support system can be created. This will not only improve the effectiveness of retirement planning models but also enhance the overall well-being and satisfaction of retirees in India.

5.5 Scope for Further Study

The study opens several avenues for further research:

5.5.1 Personalization and Customization of Retirement Plans

The future of machine learning-based retirement planning models in India lies in further enhancing the personalization and customization of retirement plans. Currently, these models leverage large datasets to provide tailored advice, but there is potential to refine this further by incorporating more granular data points. Future research could focus on integrating real-time data from various sources, including lifestyle habits, health metrics, and even social preferences, to create even more precise retirement plans. For instance, wearable technology and health monitoring apps can provide continuous data on an individual's health status, which can be factored into retirement planning. By doing so, the models can predict healthcare needs more accurately and suggest appropriate savings strategies. Additionally, cultural factors and individual preferences, such as preferred retirement age and desired lifestyle, can be better accounted for, leading to plans that truly resonate with the retiree's goals and expectations. This level of personalization will not only enhance the efficacy of retirement plans but also increase user engagement and satisfaction.

5.5.2 Incorporation of Behavioral Finance

Incorporating principles from behavioral finance into machine learning-based retirement planning models presents another promising area for research. Behavioral finance studies how psychological factors influence financial decision-making, often leading to irrational behavior that traditional models fail to account for. Future research could explore how to integrate these behavioral insights into machine learning algorithms to better predict and manage such behaviors. For example, by analyzing patterns of spending and saving, the models can identify tendencies towards over-spending or risk-averse behavior and provide tailored recommendations to counteract

these tendencies. Furthermore, the development of interactive and gamified interfaces that provide real-time feedback can help retirees understand the long-term impacts of their financial decisions, thereby encouraging more rational behavior. By addressing the psychological aspects of financial planning, these advanced models can offer more robust and realistic retirement solutions.

5.5.3 Adapting to Economic and Market Changes

Another critical area for future research is the adaptation of machine learning models to dynamic economic and market conditions. The Indian economy is characterized by volatility and rapid changes, which can significantly impact retirement savings and investment returns. Future models need to incorporate more sophisticated forecasting techniques to anticipate economic downturns, inflation rates, and other market shifts. Research can focus on developing algorithms that not only analyze historical data but also leverage predictive analytics to provide proactive advice. For example, machine learning models can be trained to recognize early warning signs of market crashes or economic slowdowns and recommend defensive investment strategies accordingly. Additionally, these models can simulate various economic scenarios to stress-test retirement plans, ensuring they remain viable under different conditions. By enhancing their ability to adapt to economic fluctuations, these models can provide retirees with more resilient and reliable financial strategies.

5.5.4 Integration with Government Policies and Social Security Systems

The integration of machine learning-based retirement planning models with government policies and social security systems is another vital research area. In India, various government schemes and regulations impact retirement planning, including the Employees' Provident Fund (EPF), Public Provident Fund (PPF), and the National Pension System (NPS). Future research could focus on how these models can be aligned with such schemes to optimize benefits for retirees. For instance, algorithms can be designed to automatically incorporate changes in tax laws, subsidy provisions, or social security benefits, ensuring that retirees receive the maximum possible advantage. Moreover, collaboration between policymakers and researchers can lead to the development of models that not only comply with existing regulations but also provide insights for future policy formulation. By integrating these models with the broader

social security framework, retirees can achieve more comprehensive and cohesive financial planning.

5.5.5 Ethical and Privacy Considerations

Ethical and privacy considerations are paramount as machine learning models become more integrated into retirement planning. The vast amounts of personal and financial data required for these models raise significant concerns about data security and privacy. Future research should focus on developing robust frameworks for data protection that comply with regulations such as the General Data Protection Regulation (GDPR) and India's own data protection laws. This includes exploring advanced encryption techniques, anonymization methods, and secure data storage solutions. Additionally, there is a need to address ethical issues related to algorithmic bias and transparency. Ensuring that machine learning models provide fair and unbiased recommendations is crucial to maintaining trust among users. Research can also explore ways to make these algorithms more transparent, allowing retirees to understand how decisions are made and to challenge or seek clarification on the advice provided. By addressing these ethical and privacy concerns, the adoption of machine learning in retirement planning can be made more secure and trustworthy.

5.5.6 Enhancing Financial Literacy and User Engagement

Finally, enhancing financial literacy and user engagement through machine learning-based retirement planning models is an important area for future research. Despite the sophistication of these models, their effectiveness is contingent on user understanding and involvement. Research can focus on developing educational tools and resources that help retirees comprehend complex financial concepts and the workings of these models. Interactive and user-friendly interfaces, powered by artificial intelligence, can provide personalized financial education and real-time guidance. Gamification techniques, such as progress tracking and rewards for achieving financial milestones, can also be employed to increase engagement. By making financial planning more accessible and engaging, these models can empower retirees to take an active role in their financial future, leading to better outcomes and higher satisfaction.

5.6 Implications of study on banking sector

The implications for banks are profound, impacting their operational efficiency, customer satisfaction, and competitive positioning in the financial services market.

Firstly, ML-based retirement planning models enable banks to offer highly personalized financial advice. Traditional models often rely on static data and generalized assumptions about market behavior and individual circumstances. In contrast, ML models can process and analyze real-time data, including spending patterns, market trends, and life events, to tailor retirement plans that align closely with individual customer goals and risk appetites. This personalization not only enhances customer satisfaction and loyalty but also positions banks as trusted advisors in financial planning. By leveraging ML, banks can provide actionable insights and recommendations that are continuously updated, ensuring that clients' retirement plans remain relevant and effective in the face of changing economic conditions.

Secondly, the integration of ML models into retirement planning can significantly improve risk management. These models excel in identifying patterns and predicting outcomes with high accuracy, enabling banks to better assess the risks associated with various investment strategies. This enhanced risk assessment capability allows banks to design retirement portfolios that optimize returns while minimizing potential downsides. Furthermore, ML models can detect early warning signals of market shifts or economic downturns, allowing banks to proactively adjust their clients' portfolios to mitigate risks. This proactive approach to risk management can enhance the stability and resilience of banks' retirement planning services, thereby protecting both the institution and its clients from unforeseen financial shocks.

Additionally, the operational efficiency of banks can be greatly enhanced through the adoption of ML-based retirement planning models. These models automate many of the complex and time-consuming tasks associated with financial planning, such as data analysis, scenario simulation, and portfolio optimization. This automation reduces the workload on financial advisors, allowing them to focus more on client relationships and strategic decision-making. Consequently, banks can achieve higher levels of productivity and cost-efficiency, which can translate into more competitive pricing for retirement planning services and better profit margins.

Moreover, ML-based retirement planning models can drive innovation and differentiation in the highly competitive financial services industry. Banks that adopt these advanced models can offer cutting-edge solutions that set them apart from competitors relying on traditional approaches. This technological edge can attract tech-

savvy clients who value data-driven decision-making and are likely to have higher lifetime value. By positioning themselves as leaders in financial technology, banks can enhance their brand reputation and attract a broader customer base.

However, the implementation of ML models also presents challenges that banks must navigate. Ensuring data privacy and security is paramount, given the sensitive nature of financial and personal information used by these models. Banks must invest in robust cybersecurity measures and comply with regulatory requirements to protect customer data. Additionally, the integration of ML models into existing systems requires significant investment in technology infrastructure and employee training, which may pose initial financial and operational hurdles.

5.7 Implications of study on Indian Government

The introduction of machine learning (ML) based retirement planning models presents significant implications for the Indian government, heralding both opportunities and challenges. These advanced models leverage vast amounts of data to predict individual retirement needs, optimize asset allocation, and personalize retirement plans, which could profoundly impact government policies, social security systems, and financial regulations.

One of the most immediate benefits of ML-based retirement planning is its potential to enhance the effectiveness and efficiency of pension schemes. Traditional pension models often rely on static assumptions and generic parameters that may not accurately reflect the diverse financial situations and retirement goals of individuals. In contrast, ML algorithms can analyze vast datasets, including demographic trends, economic indicators, and personal financial behaviors, to create highly tailored retirement plans. This personalized approach could lead to more accurate predictions of pension fund requirements, reducing the likelihood of shortfalls and ensuring better financial security for retirees.

Moreover, the adoption of ML models could improve the administration of government pension schemes such as the Employees' Provident Fund (EPF) and the National Pension System (NPS). These models can streamline the management of contributions and disbursements, detect anomalies or fraudulent activities, and forecast future funding needs with greater precision. Enhanced predictive capabilities can also help the government in making informed policy decisions, such as adjusting contribution rates

or retirement ages, based on data-driven insights into demographic changes and economic conditions.

The widespread use of ML in retirement planning could also drive increased financial literacy and engagement among Indian citizens. As individuals gain access to more personalized and transparent retirement advice, their understanding of financial planning concepts is likely to improve. This heightened awareness can lead to better saving behaviors and higher participation rates in voluntary pension schemes, ultimately reducing the dependency on government-funded social security programs. For the Indian government, this shift could alleviate some of the fiscal pressures associated with an aging population and the growing demand for social security benefits.

However, the integration of ML-based retirement planning also poses certain challenges for the Indian government. One significant concern is the need for robust data privacy and security frameworks. The effectiveness of ML models hinges on access to vast amounts of personal and financial data, raising issues related to data protection and potential misuse. The government will need to establish stringent regulations and safeguards to ensure that citizens' data is handled responsibly and securely.

Another challenge is the potential digital divide in India, where access to technology and digital literacy varies widely across different regions and socio-economic groups. The government must ensure that the benefits of ML-based retirement planning are accessible to all citizens, including those in rural areas or with limited technological access. Initiatives to bridge this digital gap, such as providing affordable internet access and digital education programs, will be crucial in ensuring equitable access to advanced retirement planning tools.

Furthermore, the rapid advancement of ML technologies necessitates continuous upskilling and training of government officials and financial advisors. The government will need to invest in education and training programs to equip its workforce with the necessary skills to manage and interpret ML-driven insights effectively.

5.8 Implications of study on aging population of India

The introduction of machine learning-based retirement planning models holds significant potential to transform the retirement landscape for the aging population of

India. These advanced models leverage vast amounts of data and sophisticated algorithms to offer more personalized, accurate, and dynamic financial planning solutions. Unlike traditional models that often rely on static assumptions and generalized predictions, machine learning models can continuously learn and adapt to changing market conditions, individual behaviors, and evolving economic scenarios. This adaptability is crucial in a country like India, where economic conditions, life expectancy, healthcare costs, and individual financial needs vary widely across different demographics.

One of the primary benefits of machine learning in retirement planning is its ability to provide highly personalized financial advice. By analyzing individual data points such as income, spending patterns, health records, and investment preferences, these models can generate tailored retirement plans that are more aligned with the specific needs and goals of retirees. This level of personalization ensures that individuals receive advice that takes into account their unique circumstances, thereby enhancing the effectiveness of their retirement strategies. For instance, a retiree with significant healthcare needs will receive a plan that allocates more resources towards medical expenses, while someone with fewer health concerns can focus more on lifestyle and leisure activities.

Moreover, machine learning models can significantly improve risk management in retirement planning. Traditional models often use historical data to predict future trends, which can be unreliable in the face of market volatility and economic uncertainties. In contrast, machine learning algorithms can analyze real-time data and identify patterns and correlations that may not be evident through conventional analysis. This allows for better forecasting of market trends, inflation rates, and other critical factors, enabling retirees to make more informed investment decisions. By dynamically adjusting to market conditions, these models can help mitigate risks and protect the financial stability of retirees, especially in times of economic downturns.

Another significant implication is the democratization of financial planning services. Machine learning-based platforms can provide high-quality financial advice at a fraction of the cost of traditional financial advisors. This is particularly important in India, where a large portion of the population may not have access to professional financial planning services due to cost constraints. By making sophisticated retirement planning tools available to a broader audience, these models can help bridge the gap

between different socio-economic groups, ensuring that more people can secure their financial futures.

Furthermore, the integration of machine learning in retirement planning can enhance the engagement and financial literacy of the retired population. Interactive platforms powered by machine learning can offer intuitive user experiences, making it easier for retirees to understand and manage their retirement plans. These platforms can provide continuous feedback and updates, helping retirees stay informed about their financial status and make necessary adjustments to their plans. Increased engagement and awareness can lead to better financial decisions and ultimately, a more secure and fulfilling retirement.

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ANNEXURES

Annexure 1: Script used for Analysis

Part – 1

#Code for factor loading calculations#

```
# Installing required packages for usage
#install.packages("seminr")
getwd()
library(seminr)
# Uploading data file for analysis
mydata=read.csv(
  file="/Users/anupsharma/Desktop/Final Thesis Chapters/ranalysis/DataF.csv",
  header=TRUE)
mydata
#Preparing Construct by adding indicators to first-order variables and
# linking first-order variables to second order variables
mmodel=constructs(
  composite("FSSE",multi_items("FSSE",1:3)),
  composite("HMWE",multi_items("HMWE",1:3)),
  composite("SFEE",multi_items("SFEE",1:3)),
  composite("LRLE",multi_items("LRLE",1:3)),
  composite("PFAE",multi_items("PFAE",1:3)),
  composite("FP",multi_items("FP",1:3)),
  composite("HP",multi_items("HP",1:3)),
  composite("ESP",multi_items("ESP",1:3)),
  composite("FLP",multi_items("FLP",1:3)),
  composite("LP",multi_items("LP",1:3)),
  composite("KSP",multi_items("KSP",1:3)),
  composite("LPFP",multi_items("LPFP",1:3)),
  composite("FS",multi_items("FS",1:3)),
  composite("HWS",multi_items("HWS",1:3)),
  composite("SS",multi_items("SS",1:3)),
  composite("LS",multi_items("LS",1:3)),
  composite("LPF",multi_items("LPF",1:3)),
  higher_composite("Exp",c("FSSE","HMWE","SFEE","LRLE","PFAE"),
```

```
                method=two_stage),
  higher_composite("Prep",c("FP","HP","ESP","FLP"),
                method=two_stage),
  higher_composite("Pref",c("LP","KSP","LPFP"),
                method=two_stage),
  higher_composite("Sat",c("FS","HWS","SS","LS","LPF"),
                method=two_stage)
)
```

#Establishing Relationships between second-order variables

```
smodel=relationships(
  paths(from=c("Exp"),to=c("Prep","Pref","Sat")),
  paths(from=c("Prep"),to=c("Sat")),
  paths(from=c("Pref"),to=c("Sat"))
)
```

#Model Estimation (path weights)

```
pmodel=estimate_pls(data=mydata,
                measurement_model = mmodel,
                structural_model = smodel,
                inner_weights = path_weighting)
pfmodel=estimate_pls(data=mydata,
                 measurement_model = mmodel,
                 structural_model = smodel,
                 inner_weights = path_factorial)
pmodel
pfmodel
```

#Summarizing Model

```
292eliabi=summary(pmodel)
```

#Inspect the model's path coefficients and the R^2 values

```
292eliabi$paths
```

Part – 2

 # Reliability HTMT Calculations #

 # Inspect the construct reliability metrics

```
293eliabi$reliability
# Bootstrap the model
bootm <- bootstrap_model(seminr_model = pmodel,
                         nboot = 5000,
                         cores = NULL,
                         seed = 123)
# Store the summary of the bootstrapped model
sumbootm <- summary(bootm)
# Inspect the bootstrapped structural paths
sumbootm$bootstrapped_paths
# Inspect the bootstrapped indicator loadings
sumbootm$bootstrapped_loadings

#bootstrapped HTMT
sumbootm$bootstrapped_HTMT

# Write the bootstrapped paths object to csv files
write.csv(x = sumbootm$bootstrapped_paths,
        file = "/Users/anupsharma/Desktop/Final Thesis
Chapters/ranalysis/boot_pathsF.csv")
write.csv(x = sumbootm$bootstrapped_loadings,
        file = "/Users/anupsharma/Desktop/Final Thesis
Chapters/ranalysis/boot_loadingsF.csv")
write.csv(x = 293eliabi$reliability,
        file = "/Users/anupsharma/Desktop/Final Thesis
Chapters/ranalysis/boot_reliabilityF.csv")
write.csv(x = sumbootm$bootstrapped_HTMT,
        file = "/Users/anupsharma/Desktop/Final Thesis Chapters/ranalysis/boot_htmtF.csv")
```

Annexure 2: R Code for Identifying clusters (Scree Plot)

```
library(tibble)
library(ggplot2)
mydata=read.csv(
  file="/Users/anupsharma/Desktop/Final Thesis Chapters/ranalysis/DataFClust.csv",
  header=TRUE)
# Decide how many clusters to look at
n_clusters <- 10
# Initialize total within sum of squares error: wss
wss <- numeric(n_clusters)
set.seed(123)
# Look over 1 to n possible clusters
for (I in 1:10) {
 # Fit the model: km.out
  km.out <- kmeans(mydata, centers = I, nstart = 20)
  # Save the within cluster sum of squares
  wss[i] <- km.out$tot.withinss
}
# Produce a scree plot
wss_df <- tibble(clusters = 1:10, wss = wss)
scree_plot <- ggplot(wss_df, aes(x = clusters, y = wss, group = 1)) +
  geom_point(size = 4)+
  geom_line() +
  scale_x_continuous(breaks = c(2, 4, 6, 8, 10)) +
  xlab('Number of clusters')
scree_plot
```

Annexure 3: R Code for clusters formation

```
mydata=read.csv(
  file="/Users/anupsharma/Desktop/Final Thesis Chapters/ranalysis/DataFClust.csv",
  header=TRUE)
set.seed(123)
km.out <- kmeans(mydata, centers = 4, nstart = 20)
km.out
km.out$centers
write.csv(x = km.out$centers,
        file = "/Users/anupsharma/Desktop/Final Thesis
Chapters/ranalysis/ClusterC.csv")
```

Annexure 4: Questions for Survey