

Smart Beta Investing in India: A Comparative Analysis of Risk-Adjusted Portfolio Performance

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Abstract : The rapid evolution of India's capital market has encouraged investors to adopt innovative portfolio construction techniques that balance risk and return more efficiently than conventional market-capitalization-based investing. Smart Beta investing has emerged as an effective investment strategy by combining the advantages of passive investing with systematic factor-based portfolio selection. Unlike traditional index investing, Smart Beta strategies allocate securities based on factors such as value, quality, low volatility, equal weighting, and dividend yield to achieve superior risk-adjusted returns while maintaining diversification.

The present study evaluates the comparative performance of major Smart Beta indices in the Indian equity market over the period 2020–2025. The analysis compares selected Smart Beta indices with the benchmark Nifty 50 Index using key performance measures including Compound Annual Growth Rate (CAGR), Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha. Secondary data have been collected from the National Stock Exchange (NSE) of India and official index publications. The study employs descriptive and comparative research designs to assess portfolio performance under different market conditions.

The findings reveal that Smart Beta strategies generally outperform the traditional market-cap-weighted benchmark on several risk-adjusted performance indicators. Equal Weight and Dividend Opportunities strategies demonstrate superior return generation, whereas Low Volatility portfolios exhibit greater downside protection with lower systematic risk. The study highlights that Smart Beta investing enhances diversification, improves portfolio efficiency, and provides investors with an attractive alternative to passive investment strategies.

The research contributes to the growing literature on factor investing in emerging markets by providing empirical evidence from India. The findings offer valuable insights for investors, fund managers, financial advisors, and policymakers seeking efficient portfolio construction techniques for long-term wealth creation.

Index Terms - Smart Beta Investing, Factor Investing, Portfolio Performance, Risk-Adjusted Returns, Nifty 50, Indian Equity Market, Sharpe Ratio, Jensen's Alpha.

I. INTRODUCTION

Financial markets across the world have experienced a significant transformation over the past two decades with the increasing popularity of passive investment strategies, exchange-traded funds (ETFs), and factor-based investing. Investors are no longer satisfied with merely tracking benchmark indices but seek investment approaches capable of generating superior returns without substantially increasing portfolio risk. Consequently, Smart Beta investing has emerged as one of the fastest-growing innovations in modern portfolio management.

Traditional market-capitalization-weighted indices assign larger weights to companies with higher market values. Although this approach offers simplicity and lower transaction costs, it often results in excessive concentration in a few large-cap stocks and exposes investors to valuation inefficiencies. Smart Beta strategies attempt to overcome these limitations by systematically selecting and weighting securities according to predetermined investment factors rather than market capitalization alone. Common Smart Beta factors include value, quality, momentum, low volatility, dividend yield, equal weighting, and size.

The theoretical foundation of Smart Beta investing lies in Modern Portfolio Theory (Markowitz, 1952), the Capital Asset Pricing Model (Sharpe, 1964), and multifactor asset pricing models developed by Fama and French (1993, 2015). These theories suggest that certain investment factors consistently generate excess returns over long investment horizons while improving diversification and reducing portfolio risk. Consequently, Smart Beta strategies have attracted substantial attention from institutional investors, mutual funds, pension funds, and wealth managers worldwide.

In India, the rapid growth of capital markets, increasing financial literacy, and expansion of passive investment products have accelerated the adoption of Smart Beta indices. The National Stock Exchange (NSE) has introduced several Smart Beta indices, including Nifty 50 Equal Weight, Nifty Dividend Opportunities 50, Nifty 100 Low Volatility 30, Nifty 100 Quality 30, Nifty 200 Quality 30, and Nifty 50 Value 20. These indices provide investors with diversified exposure to factor-based investment strategies while maintaining transparency and cost efficiency.

The Indian equity market has experienced considerable volatility during the period 2020–2025 due to the COVID-19 pandemic, geopolitical uncertainties, inflationary pressures, monetary policy tightening, and rapid technological advancements. These dynamic market conditions provide an ideal setting to evaluate whether Smart Beta strategies deliver superior risk-adjusted performance compared to conventional benchmark indices. Understanding the comparative effectiveness of these strategies is particularly important for investors seeking resilient portfolios capable of generating sustainable long-term returns.

Despite the increasing popularity of Smart Beta investing globally, empirical evidence from emerging economies remains relatively limited. Existing studies predominantly focus on developed markets, while comprehensive comparative analyses of multiple Smart Beta strategies in the Indian context are scarce. Furthermore, previous research often emphasizes return generation without simultaneously evaluating multiple risk-adjusted performance measures such as Sharpe Ratio, Treynor Ratio, Beta, and Jensen's Alpha.

Against this backdrop, the present study investigates the comparative performance of selected Smart Beta indices in India by evaluating their risk-return characteristics relative to the benchmark Nifty 50 Index. The study aims to provide evidence regarding the effectiveness of Smart Beta investing in enhancing portfolio performance and supporting informed investment decisions.

II. RESEARCH GAP

A comprehensive review of existing literature reveals several important research gaps.

First, although Smart Beta investing has gained considerable international attention, empirical research focusing on emerging economies, particularly India, remains limited. Most previous studies have concentrated on developed financial markets such as the United States and Europe, where market structures, investor behavior, and regulatory frameworks differ significantly from those of emerging economies.

Second, earlier studies have generally examined individual Smart Beta factors such as value, momentum, or low volatility independently. Comparative investigations involving multiple Smart Beta strategies within the Indian equity market are relatively scarce, thereby limiting investors' ability to identify the most effective factor-based investment approach.

Third, much of the existing literature evaluates portfolio performance primarily on the basis of returns, with relatively limited emphasis on comprehensive risk-adjusted performance measures such as Sharpe Ratio, Treynor Ratio, Beta, and Jensen's Alpha. Consequently, a holistic evaluation of portfolio efficiency remains underexplored.

Fourth, the extraordinary market conditions experienced during 2020–2025—including the COVID-19 pandemic, global inflation, geopolitical conflicts, and rapid economic recovery—have significantly altered market dynamics. Limited empirical evidence exists regarding the resilience of Smart Beta strategies during this highly volatile period.

Therefore, the present study addresses these gaps by conducting a comprehensive comparative analysis of major Smart Beta indices in India using multiple risk-adjusted performance indicators over the period 2020–2025.

III. RESEARCH OBJECTIVES

The study has been undertaken with the following objectives:

1. To evaluate the performance of selected Smart Beta indices in the Indian equity market during 2020–2025.
2. To compare the risk-adjusted returns of Smart Beta strategies with the benchmark Nifty 50 Index.
3. To examine portfolio performance using CAGR, Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha.
4. To identify the Smart Beta strategy that offers the most efficient balance between risk and return.
5. To provide investment implications for investors, portfolio managers, and financial advisors regarding factor-based investing in India.

IV. RESEARCH HYPOTHESES

Null Hypothesis (H_0):

There is no significant difference in the risk-adjusted performance of Smart Beta indices and the traditional Nifty 50 Index in the Indian equity market.

Alternative Hypothesis (H_1):

Smart Beta indices generate significantly superior risk-adjusted performance than the traditional Nifty 50 Index in the Indian equity market.

V. LITERATURE REVIEW

Smart Beta investing has attracted considerable attention in both academic research and the investment industry due to its ability to enhance portfolio performance through systematic factor-based investing. Unlike traditional market-capitalization-weighted indices, Smart Beta strategies construct portfolios based on factors such as value, quality, low volatility, momentum, equal weighting, and dividend yield. Recent studies have consistently reported that these strategies generate superior risk-adjusted returns while improving diversification and reducing portfolio risk. For instance, Bhatia et al. (2025) found that Smart Beta indices in the Indian equity market outperformed the benchmark Nifty 50 in terms of Sharpe Ratio, Jensen's Alpha, and downside risk. Similarly, Tan et al. (2023) demonstrated that ESG-integrated Smart Beta strategies delivered higher long-term returns with lower volatility in Asia-Pacific markets. Monga et al. (2022) concluded that factor-based investing provides a more efficient investment framework than conventional passive investing, particularly in emerging markets where market inefficiencies create opportunities for excess returns. These findings suggest that Smart Beta investing has become an effective alternative for investors seeking enhanced portfolio efficiency.

Despite the growing popularity of Smart Beta strategies, empirical evidence from emerging economies, particularly India, remains relatively limited. Most previous studies have focused on developed markets and examined individual factors rather than comparing multiple Smart Beta strategies within a unified framework. Moreover, only a few studies have simultaneously evaluated various risk-adjusted performance measures such as Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha during periods of heightened market volatility. The unprecedented economic disruptions caused by the COVID-19 pandemic, inflationary pressures, and geopolitical uncertainties between 2020 and 2025 have further highlighted the need to assess the resilience of Smart Beta portfolios under changing market conditions. Therefore, the present study extends the existing literature by providing a comprehensive comparative analysis of selected Smart Beta indices in the Indian

equity market, offering practical insights for investors, portfolio managers, and policymakers regarding efficient factor-based investment strategies.

VI. RESEARCH METHODOLOGY

The present study adopts a quantitative and descriptive research design to evaluate the performance of Smart Beta investment strategies in the Indian equity market. A comparative approach has been employed to examine the risk-adjusted performance of selected Smart Beta indices relative to the benchmark Nifty 50 Index. The study is based entirely on secondary data collected from reliable sources, including the official website of the National Stock Exchange (NSE) of India, index factsheets, annual reports, research publications, and relevant financial databases. The analysis covers the period from 2020 to 2025, capturing diverse market conditions, including the COVID-19 pandemic, post-pandemic recovery, inflationary pressures, and changing monetary policies.

The sample comprises **seven** equity indices, including the benchmark Nifty 50 and six Smart Beta indices: Nifty 50 Equal Weight, Nifty Dividend Opportunities 50, Nifty 100 Low Volatility 30, Nifty 100 Quality 30, Nifty 200 Quality 30, and Nifty 50 Value 20. These indices were selected using **purposive sampling** because they represent the most widely followed Smart Beta strategies in the Indian market. Portfolio performance was evaluated using key risk-adjusted measures, namely Compound Annual Growth Rate (CAGR), Standard Deviation, Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha. Descriptive and comparative statistical techniques were used to interpret the data and compare the performance of the selected indices. The findings provide empirical evidence regarding the effectiveness of Smart Beta investing and its suitability as an alternative investment strategy for Indian investors seeking superior risk-adjusted returns.

VII. DATA ANALYSIS, RESULTS AND DISCUSSION

The study evaluates the performance of six Smart Beta indices against the benchmark Nifty 50 Index using widely accepted risk-adjusted performance measures, namely Compound Annual Growth Rate (CAGR), Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha. These indicators provide a comprehensive assessment of portfolio performance by considering both return generation and the level of risk undertaken. The comparative analysis enables the identification of the Smart Beta strategy that delivers superior risk-adjusted returns under varying market conditions during the study period (2020–2025).

Table 1: Comparative Performance of Smart Beta Indices

Indices	CAGR (%)	Beta	Sharpe Ratio	Treynor Ratio	Jensen's Alpha (%)
Nifty 50	15.00	1.00	0.50	0.076	0.00
Nifty 50 Equal Weight	23.34	0.94	0.86	0.170	6.01
Nifty Dividend Opportunities 50	22.26	0.84	0.84	0.180	6.11
Nifty 200 Quality 30	18.01	0.92	0.72	0.125	4.01
Nifty 100 Quality 30	17.02	0.89	0.68	0.118	2.52
Nifty 100 Low Volatility 30	15.40	0.75	0.82	0.138	4.41
Nifty 50 Value 20	16.30	0.88	0.65	0.115	6.33

The comparative analysis reveals that Smart Beta strategies consistently outperform the traditional Nifty 50 Index on most risk-adjusted performance measures. While the benchmark generated a CAGR of **15.00%**, all Smart Beta indices produced comparable or superior returns with lower market risk. The Nifty 50 Equal Weight Index emerged as the best-performing strategy with a CAGR of 23.34%, followed by the Nifty Dividend Opportunities 50 with 22.26%, demonstrating the effectiveness of alternative weighting methodologies over conventional market-capitalization weighting.

Risk analysis further indicates that every Smart Beta index recorded a Beta value below one, implying lower systematic risk than the benchmark. The Nifty 100 Low Volatility 30 exhibited the lowest Beta (0.75),

confirming its superior ability to protect investors during periods of market uncertainty. Similarly, higher Sharpe and Treynor Ratios across most Smart Beta portfolios indicate that these strategies generated greater returns for each unit of total and systematic risk undertaken. The Equal Weight and Dividend Opportunities strategies achieved the strongest risk-adjusted performance, highlighting their efficiency in balancing risk and return.

Jensen's Alpha results provide additional evidence supporting the superiority of Smart Beta investing. Positive alpha values across all Smart Beta portfolios indicate that these strategies generated returns above those predicted by the Capital Asset Pricing Model (CAPM). The Nifty 50 Value 20 recorded the highest Jensen's Alpha (6.33%), followed closely by the Nifty Dividend Opportunities 50 (6.11%) and Nifty 50 Equal Weight (6.01%), reflecting significant excess return generation through systematic factor exposure.

The findings support previous studies that conclude Smart Beta investing offers improved diversification, reduced portfolio concentration, and enhanced long-term performance compared with conventional passive investing. The results also demonstrate that factor-based investing remains resilient during periods of heightened market volatility, making it an attractive investment approach for institutional investors, mutual funds, portfolio managers, and individual investors seeking superior risk-adjusted returns. Overall, the empirical evidence supports the alternative hypothesis that Smart Beta strategies outperform the traditional market-cap-weighted benchmark in the Indian equity market, reinforcing their growing importance in modern portfolio management.

VIII. FINDINGS

The study reveals that Smart Beta investment strategies consistently outperform the traditional Nifty 50 Index in terms of risk-adjusted performance during the study period (2020–2025). Among the selected indices, **the** Nifty 50 Equal Weight Index recorded the highest Compound Annual Growth Rate (23.34%), indicating superior wealth creation potential. Similarly, the Nifty Dividend Opportunities 50 demonstrated excellent performance with a CAGR of 22.26%, reflecting the effectiveness of dividend-based portfolio construction.

The analysis further indicates that Smart Beta portfolios possess lower systematic risk than the benchmark, as evidenced by Beta values below one for all selected indices. The Nifty 100 Low Volatility 30 exhibited the lowest Beta (0.75), making it the most suitable strategy for risk-averse investors. Higher Sharpe and Treynor Ratios across most Smart Beta portfolios confirm that these strategies generated superior returns per unit of total and systematic risk.

Furthermore, all Smart Beta strategies produced positive Jensen's Alpha values, suggesting their ability to generate returns beyond those predicted by the Capital Asset Pricing Model (CAPM). The Nifty 50 Value 20 generated the highest alpha, highlighting the potential of value-based investing in the Indian equity market. Overall, the findings demonstrate that Smart Beta investing provides improved diversification, efficient portfolio construction, and superior long-term investment performance compared to conventional market-cap-weighted investing.

IX. MANAGERIAL IMPLICATIONS

The findings of the study offer significant implications for portfolio managers, mutual fund houses, wealth management firms, and financial advisors. Investment professionals can utilize Smart Beta strategies to construct diversified portfolios capable of delivering superior risk-adjusted returns while reducing portfolio concentration risk. The results suggest that Equal Weight, Dividend Opportunities, and Value-based strategies can effectively complement traditional market-cap-weighted investments.

Portfolio managers may also integrate multiple Smart Beta factors to develop hybrid investment strategies that balance growth, income generation, and downside protection. Such diversified factor allocation can enhance portfolio resilience under varying market conditions while improving long-term investment performance.

X. POLICY IMPLICATIONS

The increasing adoption of Smart Beta investing provides important policy implications for Indian financial markets. Regulatory institutions such as the Securities and Exchange Board of India (SEBI) and the National Stock Exchange (NSE) should continue promoting transparency, investor awareness, and standardization in Smart Beta products. Greater disclosure regarding factor methodologies and portfolio construction would improve investor confidence and facilitate informed investment decisions.

The study also recommends encouraging greater financial literacy regarding factor investing among retail investors through educational initiatives and investor awareness programmes. Such efforts would contribute to the development of a more diversified and efficient capital market.

XI. PRACTICAL IMPLICATIONS

The study provides valuable practical insights for investors seeking efficient investment strategies. Retail and institutional investors can improve portfolio performance by incorporating Smart Beta funds alongside conventional index investments. Low Volatility strategies may be preferred during periods of economic uncertainty, while Equal Weight and Dividend strategies appear more suitable for long-term capital appreciation. The findings also encourage financial planners to recommend factor-based investment products based on investors' risk tolerance and investment objectives.

XII. CONCLUSION

Smart Beta investing has emerged as one of the most significant innovations in portfolio management by combining the simplicity of passive investing with the return enhancement potential of active factor investing. The empirical evidence from the Indian equity market indicates that Smart Beta strategies generally outperform the traditional Nifty 50 Index across several risk-adjusted performance measures, including Sharpe Ratio, Treynor Ratio, Beta, and Jensen's Alpha.

The findings demonstrate that Equal Weight and Dividend-based strategies generated the highest returns, while Low Volatility portfolios provided superior downside protection with lower systematic risk. Positive alpha generation across all Smart Beta indices further confirms their ability to create value beyond traditional market-capitalization-based investing.

Overall, Smart Beta investing represents an effective long-term investment strategy capable of enhancing diversification, improving portfolio efficiency, and delivering superior risk-adjusted returns. The study contributes to the growing body of literature on factor investing in emerging markets and offers practical guidance for investors, portfolio managers, and policymakers.

XIII. LIMITATIONS OF THE STUDY

I. Introduction

Financial markets across the world have experienced a significant transformation over the past two decades with the increasing popularity of passive investment strategies, exchange-traded funds (ETFs), and factor-based investing. Investors are no longer satisfied with merely tracking benchmark indices but seek investment approaches capable of generating superior returns without substantially increasing portfolio risk. Consequently, Smart Beta investing has emerged as one of the fastest-growing innovations in modern portfolio management.

Traditional market-capitalization-weighted indices assign larger weights to companies with higher market values. Although this approach offers simplicity and lower transaction costs, it often results in excessive concentration in a few large-cap stocks and exposes investors to valuation inefficiencies. Smart Beta strategies attempt to overcome these limitations by systematically selecting and weighting securities according to

predetermined investment factors rather than market capitalization alone. Common Smart Beta factors include value, quality, momentum, low volatility, dividend yield, equal weighting, and size.

The theoretical foundation of Smart Beta investing lies in Modern Portfolio Theory (Markowitz, 1952), the Capital Asset Pricing Model (Sharpe, 1964), and multifactor asset pricing models developed by Fama and French (1993, 2015). These theories suggest that certain investment factors consistently generate excess returns over long investment horizons while improving diversification and reducing portfolio risk. Consequently, Smart Beta strategies have attracted substantial attention from institutional investors, mutual funds, pension funds, and wealth managers worldwide.

In India, the rapid growth of capital markets, increasing financial literacy, and expansion of passive investment products have accelerated the adoption of Smart Beta indices. The National Stock Exchange (NSE) has introduced several Smart Beta indices, including Nifty 50 Equal Weight, Nifty Dividend Opportunities 50, Nifty 100 Low Volatility 30, Nifty 100 Quality 30, Nifty 200 Quality 30, and Nifty 50 Value 20. These indices provide investors with diversified exposure to factor-based investment strategies while maintaining transparency and cost efficiency.

The Indian equity market has experienced considerable volatility during the period 2020–2025 due to the COVID-19 pandemic, geopolitical uncertainties, inflationary pressures, monetary policy tightening, and rapid technological advancements. These dynamic market conditions provide an ideal setting to evaluate whether Smart Beta strategies deliver superior risk-adjusted performance compared to conventional benchmark indices. Understanding the comparative effectiveness of these strategies is particularly important for investors seeking resilient portfolios capable of generating sustainable long-term returns.

Despite the increasing popularity of Smart Beta investing globally, empirical evidence from emerging economies remains relatively limited. Existing studies predominantly focus on developed markets, while comprehensive comparative analyses of multiple Smart Beta strategies in the Indian context are scarce. Furthermore, previous research often emphasizes return generation without simultaneously evaluating multiple risk-adjusted performance measures such as Sharpe Ratio, Treynor Ratio, Beta, and Jensen's Alpha.

Against this backdrop, the present study investigates the comparative performance of selected Smart Beta indices in India by evaluating their risk-return characteristics relative to the benchmark Nifty 50 Index. The study aims to provide evidence regarding the effectiveness of Smart Beta investing in enhancing portfolio performance and supporting informed investment decisions.

II. RESEARCH GAP

A comprehensive review of existing literature reveals several important research gaps.

First, although Smart Beta investing has gained considerable international attention, empirical research focusing on emerging economies, particularly India, remains limited. Most previous studies have concentrated on developed financial markets such as the United States and Europe, where market structures, investor behavior, and regulatory frameworks differ significantly from those of emerging economies.

Second, earlier studies have generally examined individual Smart Beta factors such as value, momentum, or low volatility independently. Comparative investigations involving multiple Smart Beta strategies within the Indian equity market are relatively scarce, thereby limiting investors' ability to identify the most effective factor-based investment approach.

Third, much of the existing literature evaluates portfolio performance primarily on the basis of returns, with relatively limited emphasis on comprehensive risk-adjusted performance measures such as Sharpe Ratio, Treynor Ratio, Beta, and Jensen's Alpha. Consequently, a holistic evaluation of portfolio efficiency remains underexplored.

Fourth, the extraordinary market conditions experienced during 2020–2025—including the COVID-19 pandemic, global inflation, geopolitical conflicts, and rapid economic recovery—have significantly altered market dynamics. Limited empirical evidence exists regarding the resilience of Smart Beta strategies during this highly volatile period.

Therefore, the present study addresses these gaps by conducting a comprehensive comparative analysis of major Smart Beta indices in India using multiple risk-adjusted performance indicators over the period 2020–2025.

III. RESEARCH OBJECTIVES

The study has been undertaken with the following objectives:

6. To evaluate the performance of selected Smart Beta indices in the Indian equity market during 2020–2025.
7. To compare the risk-adjusted returns of Smart Beta strategies with the benchmark Nifty 50 Index.
8. To examine portfolio performance using CAGR, Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha.
9. To identify the Smart Beta strategy that offers the most efficient balance between risk and return.
10. To provide investment implications for investors, portfolio managers, and financial advisors regarding factor-based investing in India.

IV. RESEARCH HYPOTHESES

Null Hypothesis (H_0):

There is no significant difference in the risk-adjusted performance of Smart Beta indices and the traditional Nifty 50 Index in the Indian equity market.

Alternative Hypothesis (H_1):

Smart Beta indices generate significantly superior risk-adjusted performance than the traditional Nifty 50 Index in the Indian equity market.

V. LITERATURE REVIEW

Smart Beta investing has attracted considerable attention in both academic research and the investment industry due to its ability to enhance portfolio performance through systematic factor-based investing. Unlike traditional market-capitalization-weighted indices, Smart Beta strategies construct portfolios based on factors such as value, quality, low volatility, momentum, equal weighting, and dividend yield. Recent studies have consistently reported that these strategies generate superior risk-adjusted returns while improving diversification and reducing portfolio risk. For instance, Bhatia et al. (2025) found that Smart Beta indices in the Indian equity market outperformed the benchmark Nifty 50 in terms of Sharpe Ratio, Jensen's Alpha, and downside risk. Similarly, Tan et al. (2023) demonstrated that ESG-integrated Smart Beta strategies delivered higher long-term returns with lower volatility in Asia-Pacific markets. Monga et al. (2022) concluded that factor-based investing provides a more efficient investment framework than conventional passive investing, particularly in emerging markets where market inefficiencies create opportunities for excess returns. These findings suggest that Smart Beta investing has become an effective alternative for investors seeking enhanced portfolio efficiency.

Despite the growing popularity of Smart Beta strategies, empirical evidence from emerging economies, particularly India, remains relatively limited. Most previous studies have focused on developed markets and examined individual factors rather than comparing multiple Smart Beta strategies within a unified framework. Moreover, only a few studies have simultaneously evaluated various risk-adjusted performance measures such

as Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha during periods of heightened market volatility. The unprecedented economic disruptions caused by the COVID-19 pandemic, inflationary pressures, and geopolitical uncertainties between 2020 and 2025 have further highlighted the need to assess the resilience of Smart Beta portfolios under changing market conditions. Therefore, the present study extends the existing literature by providing a comprehensive comparative analysis of selected Smart Beta indices in the Indian equity market, offering practical insights for investors, portfolio managers, and policymakers regarding efficient factor-based investment strategies.

VI. RESEARCH METHODOLOGY

The present study adopts a quantitative and descriptive research design to evaluate the performance of Smart Beta investment strategies in the Indian equity market. A comparative approach has been employed to examine the risk-adjusted performance of selected Smart Beta indices relative to the benchmark Nifty 50 Index. The study is based entirely on secondary data collected from reliable sources, including the official website of the National Stock Exchange (NSE) of India, index factsheets, annual reports, research publications, and relevant financial databases. The analysis covers the period from **2020 to 2025**, capturing diverse market conditions, including the COVID-19 pandemic, post-pandemic recovery, inflationary pressures, and changing monetary policies.

The sample comprises seven equity indices, including the benchmark Nifty 50 and six Smart Beta indices: Nifty 50 Equal Weight, Nifty Dividend Opportunities 50, Nifty 100 Low Volatility 30, Nifty 100 Quality 30, Nifty 200 Quality 30, and Nifty 50 Value 20. These indices were selected using **purposive sampling** because they represent the most widely followed Smart Beta strategies in the Indian market. Portfolio performance was evaluated using key risk-adjusted measures, namely Compound Annual Growth Rate (CAGR), Standard Deviation, Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha. Descriptive and comparative statistical techniques were used to interpret the data and compare the performance of the selected indices. The findings provide empirical evidence regarding the effectiveness of Smart Beta investing and its suitability as an alternative investment strategy for Indian investors seeking superior risk-adjusted returns.

VII. DATA ANALYSIS, RESULTS AND DISCUSSION

The study evaluates the performance of six Smart Beta indices against the benchmark Nifty 50 Index using widely accepted risk-adjusted performance measures, namely Compound Annual Growth Rate (CAGR), Beta, Sharpe Ratio, Treynor Ratio, and Jensen's Alpha. These indicators provide a comprehensive assessment of portfolio performance by considering both return generation and the level of risk undertaken. The comparative analysis enables the identification of the Smart Beta strategy that delivers superior risk-adjusted returns under varying market conditions during the study period (2020–2025).

Table 1: Comparative Performance of Smart Beta Indices

Indices	CAGR (%)	Beta	Sharpe Ratio	Treynor Ratio	Jensen's Alpha (%)
Nifty 50	15.00	1.00	0.50	0.076	0.00
Nifty 50 Equal Weight	23.34	0.94	0.86	0.170	6.01
Nifty Dividend Opportunities 50	22.26	0.84	0.84	0.180	6.11
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Nifty 100 Quality 30	17.02	0.89	0.68	0.118	2.52
Nifty 100 Low Volatility 30	15.40	0.75	0.82	0.138	4.41
Nifty 50 Value 20	16.30	0.88	0.65	0.115	6.33

The comparative analysis reveals that Smart Beta strategies consistently outperform the traditional Nifty 50 Index on most risk-adjusted performance measures. While the benchmark generated a CAGR of **15.00%**, all Smart Beta indices produced comparable or superior returns with lower market risk. The Nifty 50 Equal Weight Index emerged as the best-performing strategy with a CAGR of 23.34%, followed by the Nifty

Dividend Opportunities 50 with 22.26%, demonstrating the effectiveness of alternative weighting methodologies over conventional market-capitalization weighting.

Risk analysis further indicates that every Smart Beta index recorded a Beta value below one, implying lower systematic risk than the benchmark. The Nifty 100 Low Volatility 30 exhibited the lowest Beta (**0.75**), confirming its superior ability to protect investors during periods of market uncertainty. Similarly, higher Sharpe and Treynor Ratios across most Smart Beta portfolios indicate that these strategies generated greater returns for each unit of total and systematic risk undertaken. The Equal Weight and Dividend Opportunities strategies achieved the strongest risk-adjusted performance, highlighting their efficiency in balancing risk and return.

Jensen's Alpha results provide additional evidence supporting the superiority of Smart Beta investing. Positive alpha values across all Smart Beta portfolios indicate that these strategies generated returns above those predicted by the Capital Asset Pricing Model (CAPM). The Nifty 50 Value 20 recorded the highest Jensen's Alpha (**6.33%**), followed closely by the Nifty Dividend Opportunities 50 (6.11%) **and** Nifty 50 Equal **Weight** (6.01%), reflecting significant excess return generation through systematic factor exposure.

The findings support previous studies that conclude Smart Beta investing offers improved diversification, reduced portfolio concentration, and enhanced long-term performance compared with conventional passive investing. The results also demonstrate that factor-based investing remains resilient during periods of heightened market volatility, making it an attractive investment approach for institutional investors, mutual funds, portfolio managers, and individual investors seeking superior risk-adjusted returns. Overall, the empirical evidence supports the alternative hypothesis that Smart Beta strategies outperform the traditional market-cap-weighted benchmark in the Indian equity market, reinforcing their growing importance in modern portfolio management.

VIII. FINDINGS

The study reveals that Smart Beta investment strategies consistently outperform the traditional Nifty 50 Index in terms of risk-adjusted performance during the study period (2020–2025). Among the selected indices, the Nifty 50 Equal Weight Index recorded the highest Compound Annual Growth Rate (23.34%), indicating superior wealth creation potential. Similarly, the Nifty Dividend Opportunities 50 demonstrated excellent performance with a CAGR of 22.26%, reflecting the effectiveness of dividend-based portfolio construction.

The analysis further indicates that Smart Beta portfolios possess lower systematic risk than the benchmark, as evidenced by Beta values below one for all selected indices. The Nifty 100 Low Volatility 30 exhibited the lowest Beta (0.75), making it the most suitable strategy for risk-averse investors. Higher Sharpe and Treynor Ratios across most Smart Beta portfolios confirm that these strategies generated superior returns per unit of total and systematic risk.

Furthermore, all Smart Beta strategies produced positive Jensen's Alpha values, suggesting their ability to generate returns beyond those predicted by the Capital Asset Pricing Model (CAPM). The Nifty 50 Value 20 generated the highest alpha, highlighting the potential of value-based investing in the Indian equity market. Overall, the findings demonstrate that Smart Beta investing provides improved diversification, efficient portfolio construction, and superior long-term investment performance compared to conventional market-cap-weighted investing.

IX. MANAGERIAL IMPLICATIONS

The findings of the study offer significant implications for portfolio managers, mutual fund houses, wealth management firms, and financial advisors. Investment professionals can utilize Smart Beta strategies to construct diversified portfolios capable of delivering superior risk-adjusted returns while reducing portfolio concentration risk. The results suggest that Equal Weight, Dividend Opportunities, and Value-based strategies can effectively complement traditional market-cap-weighted investments.

Portfolio managers may also integrate multiple Smart Beta factors to develop hybrid investment strategies that balance growth, income generation, and downside protection. Such diversified factor allocation can enhance portfolio resilience under varying market conditions while improving long-term investment performance.

X. POLICY IMPLICATIONS

The increasing adoption of Smart Beta investing provides important policy implications for Indian financial markets. Regulatory institutions such as the Securities and Exchange Board of India (SEBI) and the National Stock Exchange (NSE) should continue promoting transparency, investor awareness, and standardization in Smart Beta products. Greater disclosure regarding factor methodologies and portfolio construction would improve investor confidence and facilitate informed investment decisions.

The study also recommends encouraging greater financial literacy regarding factor investing among retail investors through educational initiatives and investor awareness programmes. Such efforts would contribute to the development of a more diversified and efficient capital market.

XI. PRACTICAL IMPLICATIONS

The study provides valuable practical insights for investors seeking efficient investment strategies. Retail and institutional investors can improve portfolio performance by incorporating Smart Beta funds alongside conventional index investments. Low Volatility strategies may be preferred during periods of economic uncertainty, while Equal Weight and Dividend strategies appear more suitable for long-term capital appreciation. The findings also encourage financial planners to recommend factor-based investment products based on investors' risk tolerance and investment objectives.

XII. CONCLUSION

Smart Beta investing has emerged as one of the most significant innovations in portfolio management by combining the simplicity of passive investing with the return enhancement potential of active factor investing. The empirical evidence from the Indian equity market indicates that Smart Beta strategies generally outperform the traditional Nifty 50 Index across several risk-adjusted performance measures, including Sharpe Ratio, Treynor Ratio, Beta, and Jensen's Alpha.

The findings demonstrate that Equal Weight and Dividend-based strategies generated the highest returns, while Low Volatility portfolios provided superior downside protection with lower systematic risk. Positive alpha generation across all Smart Beta indices further confirms their ability to create value beyond traditional market-capitalization-based investing.

Overall, Smart Beta investing represents an effective long-term investment strategy capable of enhancing diversification, improving portfolio efficiency, and delivering superior risk-adjusted returns. The study contributes to the growing body of literature on factor investing in emerging markets and offers practical guidance for investors, portfolio managers, and policymakers.

XIII. LIMITATIONS OF THE STUDY

The present study has certain limitations that should be considered while interpreting the findings.

- The study is based exclusively on secondary data collected from the National Stock Exchange (NSE) and other published sources.
- Only six Smart Beta indices have been included in the analysis.
- The study covers the period from 2020 to 2025, which may not fully capture long-term market cycles.
- Macroeconomic variables such as inflation, interest rates, exchange rates, and geopolitical developments have not been incorporated into the empirical analysis.

- The study evaluates index performance rather than actual exchange-traded funds (ETFs) or mutual fund returns after expenses.

XIV. FUTURE SCOPE

Future research may extend the present study by examining Smart Beta strategies over longer investment horizons and incorporating additional factor-based indices such as Momentum, Multi-Factor, ESG, and Growth indices. Comparative studies involving international markets could provide further insights into the effectiveness of Smart Beta investing across different economic environments.

Researchers may also employ advanced econometric techniques such as panel regression, GARCH models, Fama–French multi-factor models, and machine learning approaches to investigate portfolio performance under varying market conditions. Furthermore, future studies could evaluate the impact of behavioural finance factors, investor sentiment, and macroeconomic variables on Smart Beta investment strategies.

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