

MSCI ACWI IMI Disruptive Technology ESG Filtered Index

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Introduction

The MSCI ACWI IMI Disruptive Technology ESG Filtered Index (the 'Index') aims to represent the performance of companies aligned to themes commonly associated with or described as "disruptive technology".

1. Constructing the Index

The index is constructed by selecting stocks from the MSCI ACWI Investable Market Index (IMI) (the 'Parent Index') based on rules explained in the following sections.

The index selects companies which are assessed to have high exposure to business activities such as –

- 3D Printing
- Internet of Things
- Cloud Computing
- Fintech
- Digital Payments
- Healthcare Innovation
- Robotics
- Cybersecurity
- Clean Energy and Smart Grids

MSCI may seek input from outside market experts on the ongoing evolution of the theme underlying the index. However, such input is advisory only in nature. Use of any such input is at MSCI's discretion and may or may not lead to a change to the index or index methodology.

1.1 The set of relevant words and phrases used for constituent selection

MSCI uses a broad set of relevant words and phrases derived from the index objective which are important to describing products and services commonly associated with or described as "disruptive technology" such as in manufacturing, alternative energy, digital technologies and healthcare sectors.

1.2 Company level data used for assessing company exposure

The following data is used at the company level:

- Business segment information from company annual reports and vendor data sources: business segment names, assigned SIC codes¹ and related revenue
- An English language summary description of the company’s business activities from public sources.

1.3 Eligible universe

All stocks from the Parent Index which satisfy any of the following criteria are selected for the eligible universe.

1.3.1 Selection on business segments

Company identified business segment names are compared against the set of relevant words. Companies from the Parent Index which include at least one relevant word in their business segment names are included in the eligible universe.

1.3.2 Selection on company’s summary description

The company’s summary business description is compared against the set of relevant words. Companies from the Parent Index which include at least two distinct relevant words in their summary description are included in the eligible universe.

1.4 Selected business segments

‘Selected business segments’ are business segments which include at least one relevant word. These are the business segments based on which stocks are selected in section 1.3.1.

1.5 SIC code selection

Company business segments are mapped to an SIC code. The SIC code selection is a set of all the SIC codes which satisfy the following criteria

- The SIC code is mapped to at least one of the ‘selected business segments’ as described in section 1.4.
- The SIC code is assigned to the business segments of at least two different stocks from the eligible universe. SIC code 9999 is not selected.

¹ Company’s business segments are assigned with a specific SIC (Standard Industry Classification) description for products and services, used by official agencies within the US government. These descriptions provide additional information on the nature of the segment.

1.6 Calculating the stock relevance score

A relevance score for all stocks in the eligible universe is calculated. The relevance score for a company is calculated by taking into account the portion of company's revenue which is derived from the selected business segments (as described in section 1.4) filtered via the SIC code selection (as described in section 1.5).

1.6.1 Relevance score discount factor

A stock level relevance score discount factor is calculated by normalizing the cumulative frequency of relevant words in the company's summary description relative to all companies selected on summary business descriptions as described in section 1.3.2.

At company's business segment level, the revenue discount factor is applied on revenue from a 'selected SIC code'. The revenue discount factor is 1 for revenue derived from 'selected business segment'.

1.6.2 Relevance score

Relevance score for stocks in the eligible universe is calculated as follows:

Relevance score = [revenue from the selected business segments (as described in section 1.4) + relevance score discount factor * revenue from the selected SIC Code (as described in section 1.5)] / Total company revenue.

1.7 Selected universe

Stocks from the eligible universe with a relevance score of 25% or more are included in the selected universe. Further filtering is applied to the selected universe as detailed below.

1.7.1 GICS^{®2} sector and sub industry filtering

Stocks mapped to the following GICS sub industries are excluded from the selected universe.

No.	GICS Sector	GICS Sub Industries
1	Energy	<ul style="list-style-type: none"> Integrated Oil & Gas
2	Industrials	<ul style="list-style-type: none"> Office Services & Supplies
3	Consumer Staples	<ul style="list-style-type: none"> Packaged Foods & Meats
4	Utilities	<ul style="list-style-type: none"> Electric Utilities Multi-Utilities Independent Power Producers & Energy Traders

1.7.2 ESG exclusion criteria

Controversial business exclusion criteria

Securities of companies involved in following businesses are excluded from the selected universe:

- Controversial Weapons
- Nuclear Weapons
- Civilian Firearms
- Tobacco
- Thermal Coal
- Oil Sands
- UN Global Compact Violators

² GICS, the global industry classification standard jointly developed by MSCI and S&P Global.

Please refer to Appendix 1 for more details on these criteria.

ESG Controversy Score

- ESG Controversy Score = 0 ('Red Flag' companies) – Companies involved in very severe business controversies as defined by the MSCI ESG Controversies Methodology are excluded from the selected universe.
- Missing Controversy Score – Companies not assessed by MSCI ESG Research's MSCI ESG Controversy Scores are excluded from the selected universe.

ESG Rating

- ESG Rating = 'CCC' – Companies having an MSCI ESG Rating of 'CCC' are excluded from the selected universe.
- Missing ESG Rating – Companies which are not rated by MSCI ESG Research for an MSCI ESG Rating are excluded from the selected universe.

1.7.3 Liquidity screening criteria

Securities that have a 3-month average daily trading value (3M ADTV) less than 3 million USD are excluded from the selected universe. For the calculation of ADTV, please refer to Appendix 2.

1.7.4 Size screening criteria

Securities that have a free-float market capitalization less than 200 million USD are excluded from the selected universe.

1.7.5 Emerging Markets (EM) country filter

Emerging Markets (EM) securities from only the below select countries are eligible for inclusion in the final index:

- China
- Taiwan
- South Korea
- South Africa
- Brazil
- Thailand
- Malaysia

- Mexico

1.8 Security selection

After applying the filters to the selected universe as detailed in section 1.7, securities are ranked in descending order of their relevance score as calculated in section 1.6.2. If multiple securities have the same relevance score, then the security having a higher weight in the Parent Index is given a higher rank.

Securities in the top half of the ranked universe are eligible for inclusion in the final index. The final number of securities in the index is determined as:

$N = \text{Minimum} (\text{Maximum} (\text{Securities in the top half of the ranked universe}, 60), 250)$

The top 'N' securities from the ranked universe are selected for inclusion in the Index. If the number of securities in the universe is below 60, all the securities in the universe are selected for inclusion in the index.

1.9 Determination of fundamental score

The fundamental score for each security obtained after filtering the selected universe (as detailed in section 1.8) is calculated by combining Z-Scores of three winsorized fundamental variables, namely Percentage of sales spent on R&D and Capex, Return on Invested Capital and 1-YR Sales growth. The details of the calculation of these fundamental variables are provided in Appendix 3.

1.9.1 Winsorizing the fundamental variables

As part of the standardization process, outlier fundamental variable values are winsorized to ensure that the average values used to standardize the variables are less affected by extreme values. To do this, for a given variable, the values for all securities are first ranked in ascending order within selected security universe in section 1.8. Missing values are excluded from the ranking. Then, for securities that lie below the 5th percentile rank or above the 95th percentile rank, their value is set equal to the value of the 5th percentile ranked or 95th percentile ranked security, as applicable. This process is repeated for each of the three fundamental variables.

1.9.2 Calculating the z-scores

After winsorizing all the three fundamental variables, the Z-Score for each of the three variables for each security can be calculated using the mean and standard deviation of the relevant variable. Computing a Z-Score is a widely used method of standardizing a variable in order to combine it with other variables that may have a different unit of measurement or a different scale. Because it has a mean value of zero and a standard deviation of 1, the value of a z-score shows how many standard deviations a given value lies from the mean.

The Z-Score is defined as follows:

$$z = \frac{(x - \mu)}{\sigma}$$

Where:

- x is the winsorized variable for a given security
- μ is the mean of the winsorized variable, excluding missing values
- σ is the standard deviation of the winsorized variable, excluding missing values

1.9.3 Calculating the fundamental score

After standardizing each of the three fundamental variable values for each security in the selected security universe, a composite fundamental Z-Score is calculated for each security. The composite fundamental Z-Scores are computed by averaging the Z scores of all the three fundamental variables as calculated in section 1.9.2.

The Fundamental Score is then computed from the composite fundamental Z-Score as follows:

$$Fundamental\ Score = \begin{cases} 1 + Z, & Z > 0 \\ (1 - Z)^{-1}, & Z < 0 \end{cases}$$

Where Z is the composite fundamental Z-Score.

1.10 Weighting scheme

At each rebalancing, all the securities eligible for inclusion are assigned weights in proportion to the Fundamental Score calculated in the previous step.

1.10.1 Emerging Markets (EM) weight capping

Aggregate weight of Emerging Markets (EM) securities in the final index is capped at aggregate weight of Emerging Markets (EM) in the Parent Index + 10% to limit the geographical exposure of the index to Emerging Markets.

1.10.2 Security weight capping

Additionally, index constituents' weights are capped at 15% at the security level to mitigate concentration risk.

2 Maintaining the Index

2.1 Semi-Annual Index Review

The index is reviewed on a Semi-Annual basis in May and November to coincide with the May and November Semi-Annual Index Reviews of the Parent Index, and the changes are implemented at the end of May and November. In general, the pro forma index is announced nine business days before the effective date.

During the Semi-Annual Index Review, the eligible universe and selected universe are updated.

In general, MSCI uses the company business segment names, business description and revenue data as of the end of the month preceding the semi-annual index review.

2.1.1 Security selection buffer rules

To reduce index turnover and enhance index stability, a buffer rule of 25% is applied during the on-going semi-annual index reviews. For example, if the 'index' targets 60 securities, buffers are applied between rank 46 and 75. The securities in the ranked universe (as detailed in section 1.8) with a relevance score rank at or above 45 will be added to the final index on a priority basis. The existing constituents that have a relevance score rank between 46 and 75 are then successively added until the number of securities in the final index reaches 60. If the number of securities is below 60 after this step, the remaining securities in the ranked universe with the highest relevance score rank are added until the number of securities in the final index reaches 60.

2.2 Annual Index Review

The set of relevant words (as described in section 1.1) are reviewed by MSCI during the May Semi-Annual Index Review.

2.3 Ongoing event-related maintenance

The general treatment of corporate events in the index aims to minimize turnover outside of Index Reviews. The methodology aims to appropriately represent an investor's participation in an event based on relevant deal terms and pre-event weighting of the index constituents that are involved. Further, changes in index market capitalization that occur as a result of corporate event implementation will be offset by a corresponding change in the Variable Weighting Factor (VWF) of the constituent.

The following section briefly describes the treatment of common corporate events within the index.

No new securities will be added (except where noted below) to the index between Index Reviews. Parent Index deletions will be reflected simultaneously.

EVENT TYPE	EVENT DETAILS
New additions to the Parent Index	A new security added to the parent index (such as IPO and other early inclusions) will not be added to the index.
Spin-Offs	All securities created as a result of the spin-off of an existing Index constituent will be added to the Index at the time of event implementation. Reevaluation for continued inclusion in the Index will occur at the subsequent Index Review.
Merger/Acquisition	For Mergers and Acquisitions, the acquirer's post event weight will account for the proportionate amount of shares involved in deal consideration, while cash proceeds will be invested across the Index. If an existing Index constituent is acquired by a non-Index constituent, the existing constituent will be deleted from the Index and the acquiring non-constituent will not be added to the Index.
Changes in Security Characteristics	A security will continue to be an Index constituent if there are changes in characteristics (country, sector, size segment, etc.) Reevaluation for continued inclusion in the Index will occur at the subsequent Index Review.

Further detail and illustration regarding specific treatment of corporate events relevant to this Index can be found in the MSCI Corporate Events Methodology.

The MSCI Corporate Events methodology book is available at: <https://www.msci.com/index-methodology>.

Appendix 1: Controversial Business Exclusion Criteria

MSCI ESG Research has developed a framework designed to define significant involvement in controversial activities. According to this framework, there are three tolerance levels: Zero Tolerance, Minimal Tolerance and Low Tolerance.

Each controversial activity (except Thermal Coal, Oil Sands and Global Norms) screened out by the Index is assigned to one of these tolerance levels:

Activities classified under “Zero Tolerance”

- Controversial Weapons
 - All companies with any tie to Controversial Weapons (cluster munitions, landmines, depleted uranium weapons, biological/chemical weapons, blinding lasers, non-detectable fragments and incendiary weapons), as defined by the methodology of the MSCI Ex-Controversial Weapons Indexes available at <https://www.msci.com/index-methodology>.

Activities classified under “Minimal Tolerance”

- Nuclear Weapons
 - All companies that manufacture nuclear warheads and/or whole nuclear missiles.
 - All companies that manufacture components that were developed or are significantly modified for exclusive use in nuclear weapons (warheads and missiles).
 - All companies that manufacture or assemble delivery platforms that were developed or significantly modified for the exclusive delivery of nuclear weapons.
 - All companies that provide auxiliary services related to nuclear weapons.
 - All companies that manufacture components that were not developed or not significantly modified for exclusive use in nuclear weapons (warheads and missiles).
 - All companies that manufacture or assemble delivery platforms that were not developed or not significantly modified for the exclusive delivery of nuclear weapons.
 - All companies that manufacture components for nuclear-exclusive delivery platforms.

- Civilian Firearms
 - All companies classified as “Producer” of firearms and small arms ammunitions for civilian markets. It does not include companies that cater to the military, government, and law enforcement markets.
 - All companies deriving 5% or more revenue from the distribution (wholesale or retail) of firearms or small arms ammunition intended for civilian use.
- Tobacco
 - All companies classified as a “Producer”
 - All companies deriving 5% or more aggregate revenue from the production, distribution, retail and supply of tobacco-related products.

Activities not classified under any specific tolerance level

- Thermal Coal
 - All companies deriving 5% or more revenue (either reported or estimated) from the mining of thermal coal (including lignite, bituminous, anthracite and steam coal) and its sale to external parties. It excludes: revenue from metallurgical coal; coal mined for internal power generation (e.g. in the case of vertically integrated power producers); intra-company sales of mined thermal coal; and revenue from coal trading.
 - All companies deriving 5% or more revenue (either reported or estimated) from the thermal coal based power generation.
- Oil Sands
 - All companies deriving 5% or more revenue from oil sands extraction, which own oil sands reserves and disclose evidence of deriving revenue from oil sands extraction. Companies that derive revenue from non-extraction activities (e.g. exploration, surveying, processing, refining) or intra-company sales are not excluded. Additionally, companies that own oil sands reserves with no associated revenue are also not excluded.
- Global Norms – United Nations Global Compact Compliance
 - All companies that fail to comply with the United Nations Global Compact principles.

Appendix 2: Calculation of 3-Month Average Daily Traded Value (ADTV)

$$ADTV = \frac{ATV}{252}$$

Where:

- ADTV = 3-month Average Daily Traded Value
- ATV = 3-month Annualized Traded Value

For details on the calculation of ATV, please refer to the MSCI Fundamental Data Methodology (<https://www.msci.com/index-methodology>).

Appendix 3: Calculation of Fundamental Variables

Fundamental Variable	Calculation Details
Percentage of % Sales spent on R&D and Capex	$\% \text{ Sales spent on R\&D and Capex} = \frac{\text{Capital Expenditures to Sales Ratio}_t + \text{Research and Development Expenses to Sales Ratio}_t}{1}$
Return on Invested Capital	$ROIC = \frac{\text{Operating Income}_t}{\text{Invested Capital}_t}$ <p>Where:</p> <ul style="list-style-type: none"> • $\text{Operating Income}_t$ = Operating income before unusual expense • $\text{Invested Capital}_t$ = Shareholder's equity + Total Debt + Minority Interest
1-YR Sales Growth	$\text{Sales Growth} = \frac{\text{Sales in USD}_t}{\text{Sales in USD}_{t-1}} - 1$

For more details on the fundamental data, please refer to the MSCI Fundamental Data Methodology (<https://www.msci.com/index-methodology>).

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