MSCI THEMATIC RELEVANCE SCORE METHODOLOGY

April 2022

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1   Introduction

In recent times, 'Thematic Investing' has received strong interest from both institutional investors and retail investors alike. Thematic investing is a top-down investment approach which seeks to capitalize on potential opportunities created by major trends that are structural and transformative in nature, rather than short-term shifts. At MSCI, we consider that these trends fall into four categories: Environment & Resources, Transformative Technologies, Health & Healthcare, and Society & Lifestyle.

MSCI launched a range of thematic indexes that seek to represent the performance of a set of companies that are associated with products and services focused on these themes[1]. Within the MSCI thematic index methodologies, potential constituents are selected and reweighted using a measure of their economic linkage to the underlying theme. This MSCI metric is called the stock's 'Relevance Score'.

The Relevance Score is designed to measure the importance of a theme to the company's business activities and may reflect both "upstream" activities (capex, M&A, product development, competitive agenda) that can be gleaned from corporate information sources such as filings as well as established relevant revenue or earnings streams disclosed at the business line level[2]. The score ranges between 0% and 100%. However, it should be noted that it is not an explicit measurement or estimate of the proportion of revenue that the company derives from business activities exposed to the theme.

The Relevance Score may also enable investors to understand better how themes impact their portfolio's profile, complementing more traditional country, industry and factor lenses for analysis[3].

Please refer to MSCI's suite of themes: https://www.msci.com/our-solutions/indexes/thematic-investing/megatrends.

In the following sections, we describe the data used in the calculation of the theme Relevance Score as well as the steps in its calculation. We also highlight how the Relevance Score calculation may be refined or extended to better target certain themes.

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[1] https://www.msci.com/our-solutions/indexes/thematic-investing

[2] These information sources are often updated on an annual basis for a given company and the calculation reflects them as soon as they are updated within MSCI's production environment

[3] https://www.msci.com/www/blog-posts/a-thematic-lens-for-portfolios/02244244368

2   Data Requirements

2.1   The set of relevant words and phrases[4] used for assessing a company's thematic exposure

MSCI uses a broad set of 'relevant words and phrases' derived from the theme objective which are important to describing the products and services of companies focused on the theme.

These products and services, as summarized by sub-theme categories, are currently detailed in section 2 of the corresponding thematic index methodology documents which can be found here - https://www.msci.com/index-methodology.

The set of relevant words and phrases for a given theme is reviewed annually, as per section 3.2 of the respective index methodology document. However, the subtheme categories of products and services used to generate the set of relevant words and phrases would only be updated following a public consultation on the respective index methodology.

2.2   Company level data[5] used for assessing a company's thematic exposure

The following data is used at the issuer level:

• Business segment information from companies' annual reports and vendor data sources: business segment names, SIC[6] codes assigned to those business segments, business segment revenues and business segment assets.

• A summary description of the companies' business activities from public sources expressed in English[7].

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[4] For more details on the considerations required to generate such a set of relevant words and phrases, please see https://www.msci.com/www/research-paper/indexing-change-understanding/01647260939

[5] In general, MSCI uses the latest available company business segment names, SIC Codes, business description and revenue data as of the relevance score calculation date.

[6] Companies' business segments are assigned 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 business segment.

[7] May include use of filings reports where available.

3   Calculating the theme's Relevance Score

3.1   Constructing the Coverage Universe

The Coverage Universe is a global universe of 90,000+[8] equities, including all securities in MSCI ACWI Investable Market Index (IMI).

3.2   Constructing the Estimation Universe

The Estimation Universe consists of all securities in the ACWI Investable Market Index (IMI), China A Onshore IMI, China All Shares IMI, in addition to securities listed on these US exchanges - New York Stock Exchange (NYSE), NASDAQ, NYSE American, NYSE Arca and BATS Exchange (BZX). The Estimation Universe is used to determine the set of selected SIC codes, as detailed in section 3.3.4. The set of selected SIC codes is used to calculate relevance scores for all issuers in the Coverage Universe.

3.3 Constructing the Eligible Universe

3.3.1   Direct selection via business segments

Company-identified business segment names are compared against the set of theme-related words and phrases. Companies from the Coverage Universe which include at least one relevant word in their business segment names are included in the Eligible Universe.

3.3.2   Indirect selection via company's summary description

The company's summary business description is analyzed using the set of relevant words. Companies from the Coverage Universe which include at least two distinct relevant words in their summary description data are included in the Eligible Universe.

3.3.3   Selected business segments

'Selected business segments' are business segments which include at least one relevant word. These are the business segments utilized to determine which stocks are selected in section 3.3.1.

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[8] As of March 31, 2022

3.3.4 SIC code selection

Company business segments are mapped to a 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' of securities in the Estimation Universe as described in section 3.3.3

- The SIC code is assigned to the business segments of at least two different securities from the Eligible Universe. SIC code 9999 is not selected.

3.4 Calculating the Relevance Score

The Relevance Score is a measure of economic association between a company and a theme. It is a number between 0% and 100% which represents the strength of this linkage.

All the revenue from a company's selected business segments (identified in section 3.3.3) is used in the calculation of the Relevance Score, as this revenue has been directly identified in the company's self-reported business segment information.

Another portion of a company's revenue that is considered is that from the selected SIC code (see section 3.3.4). However, reflecting the greater uncertainty since this portion has been obtained via the SIC code mapping, we reduce the attributed revenue by using a discount factor. The Relevance Score discount factor is calculated as shown below.

3.4.1 Relevance Score discount factor

An issuer-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 description as described in section 3.3.2.

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

3.4.2 Relevance Score

Relevance Score =

[revenue from the selected business segments (section 3.3.3) + Relevance Score discount factor * revenue linked to the selected SIC codes (section 3.3.4)]/Total company revenue.

3.4.3   Treatment[9] for the Genomic Innovation theme of securities with zero revenue

Some companies at an early stage of development of new products and services (these have been found to be particularly pervasive in the area of biotechnology) may not have any revenues in their business, only costs. Such companies would be assigned a zero Relevance Score in accordance with section 3.2.2. Hence, an extended approach is needed to provide a scale for the calculation of relevance score in order to reflect the evident economic linkage via a non-zero relevance score for such companies. The relevance score is calculated as follows:

Relevance Score =

[assets from the selected business segments (section 3.3.3) + relevance score discount factor * assets from the selected SIC code (section 3.3.4)]/ Total company assets.

For the avoidance of doubt, if such a company were to have revenue streams in the future, then the relevance score calculation would proceed as per 3.4.2.

3.4.4   Sector peer-group-based calculation of Relevance Score[10] for the Next Generation Internet Innovation theme

Some companies which *a priori* seem closely associated with a theme may not currently have business segments that reflect company's exposure to the theme and the company may be currently "isolated" within its traditional industry as a play on the theme. So, the SIC codes assigned to such companies may not reflect their exposure to theme. Hence, an extended approach is needed in order to better reflect the economic linkage for such companies. In this approach, a Relevance Score is generated from the average relevance score of their GICS®[11] sector peers. Securities eligible for this calculation are identified as follows:

- Sort the Eligible Universe in descending order of number of unique keywords matches in the summary business description.

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[9] As the Relevance Score methodology is reviewed and potentially revised over time, this rule may be applied to other themes as well. But to date, this extension to the core calculation has been adopted when it is "central" to capture a particular theme given the pervasiveness of a pattern of fundamental data for certain companies.

[10] As the Relevance Score methodology is reviewed and potentially revised over time, this rule may be applied to other themes as well. But to date, this extension to the core calculation has been adopted when it is "central" to a capture a particular theme given the pervasiveness of a pattern of fundamental data for certain companies.

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

- Identify companies in the top quartile that showed a match with at least 5 unique keywords

- Company's word-match-based discount factor is greater than 75%.

- Relevance Score as calculated in section 3.4.2 alone is equal to zero.

For all such companies, the extended Relevance Score calculation proceeds as follows:

First, a GICS sub-industry level relevance score is calculated as the simple average of the Relevance Scores of all stocks in the Eligible Universe belonging to the same GICS sub-industry as the target security. Only stocks with relevance score > 0 are considered for average calculation.

Second, the sector peer-group Relevance Score is calculated by taking simple average of the GICS sub-industry level relevance score of all GICS sub-industries belonging to the GICS sector of which the target security is a member.

This score is then used as the company Relevance Score.

3.4.5 Treatment for securities with relevance score discount factor =0[12] for the Blockchain Economy theme

Some companies, particularly financial exchanges or banks, which provide services including trading and clearing of cryptocurrency related products, but which may not discuss these businesses in great detail in their company description or which may not have separate reportable segments for these activities, will be assessed to have zero discount factor, in accordance with section 3.4.1.

In order to accurately reflect this economic linkage, a security level fallback discount factor is calculated for all companies in the coverage universe which include at least one distinct relevant word in their summary description. This is calculated by normalizing the cumulative frequency of relevant words in the company's summary description relative to all such companies.

For such securities, relevance score is calculated as follows:

- For securities mapped to these two GICS® industries - Banks and Capital Markets,

1. Relevance Score = 0, if discount factor calculated in accordance with section 3.4.5 < 0.75

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[12] As the Relevance Score methodology is reviewed and potentially revised over time, this rule may be applied to other themes as well. But to date, this extension to the core calculation has been adopted when it is "central" to a capture a particular theme given the pervasiveness of a pattern of fundamental data for certain companies.

2. Otherwise, Relevance Score = discount factor calculated as described in section 3.4.5

Relevance Score = 0 for securities mapped to all other GICS® industries.

3.4.5.1 SIC code-based relevance score for the Blockchain Economy theme

A SIC code-based relevance score is calculated for all securities in the coverage universe which have business segments mapped to any of the SIC codes below,

1. 3674
2. 3571
3. 6231
4. 7372
5. 7374

SIC code-based relevance score = [revenue from business segments mapped to the above mentioned SIC codes* relevance score discount factor (as described in section 3.4.1) - revenue from the selected business segments (as described in section 3.3.3)] / Total company revenue.

A combined relevance score is calculated as follows:

Combined Relevance Score = max (relevance score as calculated in section 3.4.2, relevance score as calculated in section 3.4.5, SIC-code based relevance score as calculated in section 3.4.5.1).

4   Corrections Policy

Any correction applied by MSCI to the underlying data used in the Relevance Score calculation of a company would result in a recalculation of Relevance Score for all the impacted companies. The recalculated scores of all the other impacted companies are updated in the product files.

Following a correction, the impacted company's revised Relevance Score is compared with its original value. If the absolute change in Relevance Score is greater than 90% AND the relative percentage change in Relevance Score is greater than 90%, an announcement is made by MSCI with the revised Relevance Score for the impacted company.

Appendix I

We illustrate the detailed calculation of the Relevance Score with the help of an example below.

1. Exhibit 1 below shows the company's segment data as described in section 3.3.1. It also highlights the 'direct' exposure obtained via the selected segment, highlighted in red, which contains a match with one relevant word, as described in section 3.3.3. In addition, it shows that the SIC code 7372 is a selected SIC code, as described in section 3.3.4, since it is mapped to a selected segment.

2. Exhibit 2 shows the company's business description and highlights the 'indirect' exposure obtained via the description data. It shows in red the matches with relevant words that were found in the description, as described in section 3.3.2.

3. Exhibit 3 shows the discount factor for this company calculated as described in section 3.4.1.

4. Exhibit 4 shows the final calculation step as described in section 3.4.2; the relevance score is obtained by first calculating the attributable revenue. In addition to revenue from the selected segment, the attributable revenue consists of a discounted proportion of revenue from the segment linked to the SIC code 7993 since that is mapped to the selected segment of another company in the universe. The attributable revenue is then scaled by the total revenue of the company to arrive at the relevance score.

①

CAPCOM CO. LTD.

Segments	SIC	Sales (mm)
Digital Content	7372	697.1
Amusement Facilities Business	7993	96.2
Amusement Machine Business	3999	73.4
Other	9999	22.0
Eliminations and Corporate	9999	0

②

APPENDIX

CAPCOM CO. LTD. mainly engages in digital contents business, amusement facility business and others. The Company operates in three segments. The Digital Contents segment develops and sells household games and online games, and contents for cell phones. The Amusement Facility segment operates stores that set up a game machine. The Amusement Equipment segment develops, manufactures and sells game machine which were sold for store operators. The Company also involves the character-related license business and the real estate leasing business.

③

Discount Factor

0.84

④

CAPCOM CO. LTD.

Segments	SIC	Sales (mm)	Selected Segment	Selected SIC Code	Disc. Factor	Attributable Revenue
Digital Content	7372	697.1	Yes		1.00	697.1
Amusement Facilities Business	7993	96.2		Yes	0.84	80.36
Amusement Machine Business	3999	73.4			0.00	
Other	9999	22.0			0.00	
Eliminations and Corporate	9999	0			0.00	

Relevance Score = 0.87

Source: MSCI Research

The following sections have been modified since April 2022:

- Sections 3.1 and 3.2
- Corrections Policy

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