

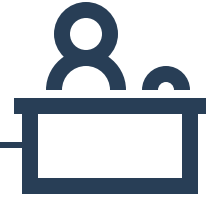
Mettle Capital | January 2022 White Paper

DATA METHODOLOGY & USE CASES

Mettle offers Data-as-a-Service (DaaS) to quantify material ESG, Reputation, and Trust sentiment for listed and non-listed companies around the world since 2010



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ESG INTEGRATION, REPUTATIONAL RISK, BRAND TRUST



Mettle offers Data-as-a-Service (DaaS) to quantify the material Environmental, Social & Governance (ESG), Reputation, and Trust sentiment for listed and non-listed companies around the world since 2010.

Sustainable Investment Data

Mettle provides the underlying sentiment scores per day at driver level (e.g. greenhouse gas emissions), lens level (e.g. Environment), and screen level (e.g. ESG) to inform the investment research process. Driver volume indicates dynamic materiality and is a key signal to forward-looking performance. Users are able to pick and choose which combination of drivers to analyse. Content analysis tools allow a deep dive to understand why the trend in debate is pivoting. Mettle does not provide ratings.

Screen	Lens	Description
ESG	Environment	Conservation of the natural world
	Social	Consideration of people & relationships
	Governance	Standards for running a company
Reputation	Dimensions	Universal themes
	Issues	Emerging, sector-specific themes
Trust	Ability	Does it do what it says on the tin?
	Beliefs	Do I care?
	Consistency	Does it do what it says over time?



Mettle's taxonomy is underpinned by three peer-reviewed and publicly available models

1. The ESG model is derived from Sustainability Accounting Standards Board (SASB)
2. The Reputation model is derived from academic literature with a machine learning functionality that reveals emerging issues
3. The Trust model is derived from academic literature and World Economic Forum.

Lens	Driver	Description
Environment	Air Quality	The management of air quality impacts resulting from stationary and mobile sources as well as industrial emissions.
	Ecological Impacts	The management of the company's impacts on ecosystems and biodiversity through activities including, but not limited to, land use for exploration, natural resource extraction, and cultivation, as well as project development, construction, and siting.
	Energy Management	The environmental impacts associated with energy consumption.
	GHG Emissions	Direct (Scope 1) greenhouse gas (GHG) emissions that a company generates through its operations.
	Water & Hazardous Materials	Environmental issues associated with hazardous and non-hazardous waste generated by companies.
	Waste & Wastewater Management	A company's water use, water consumption, wastewater generation, and other impacts of operations on water resources, which may be influenced by regional differences in the availability and quality of and competition for water resources.

1. <https://www.sasb.org/>
 2. Tucker, Andrew. 2008. Trade Associations as Industry Reputation Agents: A Model of Reputational Trust. *Business and Politics*. 10. 4-4.
 3. Fisher J, Van Heerde J, Tucker A. Does One Trust Judgement Fit All? Linking Theory and Empirics. *The British Journal of Politics and International Relations*. 2010;12(2):161-188.
- WEF. 2015. [The Evolution of Trust in Business: From Delivery to Values](#)



Lens	Driver	Description
Social	Access & Affordability	A company's ability to ensure broad access to its products and services, specifically in the context of underserved markets and/or population groups.
	Customer Privacy	The management of risks related to the use of personally identifiable information (PII) and other customer or user data for secondary purposes including but not limited to marketing through affiliates and non-affiliates.
	Customer Welfare	Customer welfare concerns over issues including, but not limited to, health and nutrition of foods and beverages, antibiotic use in animal production, and management of controlled substances.
	Data Security	The management of risks related to collection, retention, and use of sensitive, confidential, and/or proprietary customer or user data.
	Employee Engagement	A company's ability to ensure that its culture and hiring and promotion practices embrace the building of a diverse and inclusive workforce that reflects the makeup of local talent pools and its customer base.
	Employee Health & Safety	A company's ability to create and maintain a safe and healthy workplace environment that is free of injuries, fatalities, and illness (both chronic and acute).
	Human Rights & Community Relations	The management of the relationship between businesses and the communities in which they operate, including, but not limited to, management of direct and indirect impacts on core human rights and the treatment of indigenous peoples.
	Labor Practices	The company's ability to uphold commonly accepted labor standards in the workplace, including compliance with labor laws and internationally accepted norms and standards.
	Product Quality & Safety	Issues involving unintended characteristics of products sold or services provided that may create health or safety risks to end-users.
	Selling Practices & Product Labeling	Social issues that may arise from a failure to manage the transparency, accuracy, and comprehensibility of marketing statements, advertising, and labeling of products and services.
Governance	Business Ethics	The company's approach to managing risks and opportunities surrounding ethical conduct of business, including fraud, corruption, bribery and facilitation payments, fiduciary responsibilities, and other behavior that may have an ethical component.
	Business Model Resilience	An industry's capacity to manage risks and opportunities associated with incorporating social, environmental, and political transitions into long-term business model planning.
	Competitive Behavior	Social issues associated with existence of monopolies, which may include, but are not limited to, excessive prices, poor quality of service, and inefficiencies.
	Critical Incidence Risk Management	The company's use of management systems and scenario planning to identify, understand, and prevent or minimize the occurrence of low-probability, high-impact accidents and emergencies with significant potential environmental and social externalities.
	Management of the Legal & Regulatory Environment	A company's approach to engaging with regulators in cases where conflicting corporate and public interests may have the potential for long-term adverse direct or indirect environmental and social impacts.
	Materials Sourcing & Efficiency	Issues related to the resilience of materials supply chains to impacts of climate change and other external environmental and social factors.
	Product Design & Lifecycle Management	Incorporation of environmental, social, and governance (ESG) considerations in characteristics of products and services provided or sold by the company.
	Physical Impacts of Climate Change	The company's ability to manage risks and opportunities associated with direct exposure of its owned or controlled assets and operations to actual or potential physical impacts of climate change.
	Supply Chain Management	The management of environmental, social, and governance (ESG) risks within a company's supply chain.
	Systemic Risk Management	The company's contributions to or management of systemic risks resulting from large-scale weakening or collapse of systems upon which the economy and society depend.



Lens	Driver	Description
Dimension	Community	The company's engagement with charities, sponsorships, philanthropy, local collaborations, social/corporate responsibility initiatives, and the wider CSR conversation
	Culture	The perception of a company's culture, does it do the right thing, its organisational behaviour, is it inclusive, is there a 'kiss up kick down' mentality
	Ethical	A company's perceived integrity and ethics, particularly in relation to taxes, corruption, bribery, fraud
	Robust	The perception of the company as able to deal with disruption, its resilience, its crisis management, its agility, is risk management, its continuous improvement
	Relevant	Is the company still relevant, is it transforming its products and services to meet changing demand, is it innovative and able to reinvent itself
	Management	Conversations relating to all C-suite personnel
	Sustainable	The perception that the company is sustainable in the round, from air pollution to water management
Issue	Plastics	Conversations relating to the company's exposure to plastics' contamination of the natural world
	Biodiversity	Conversations relating to the company's exposure to changes in the biosphere like deforestation, climate change, land use relating to wildlife
	Fourth Industrial Revolution	The extent to which the company is impacted by Industry 4.0, for example automation, internet of things, Artificial Intelligence
	Net Zero	Where the company features in the drive towards net zero, whether its targets are credible, whether it is part of the problem/solution
	Business Model	Is the company's business model seen as fit for purpose, in terms of operational excellence, asset strategy, company of the future
	Investment Potential	Do investors see the company as having a strong investment potential
	Modern Workforce	Is the company leading the evolution of the workforce, in terms of talent, productivity, the new normal
	Power of big data*	The degree to which practical analysis of amassed data can unlock transformative new opportunities for businesses and consumers by exploiting its volume, velocity and variety
	Data bias*	Fair, transparent and auditable application of machine learning and artificial intelligence to supporting more insightful decisions and controls for lenders and consumers, including the vulnerable
	End of analogue*	The increase in information processing speed, accuracy and efficiency delivered through full-digital processes and service/product delivery across the full breadth and depth of the business
	Personal data*	Commitments made and upheld around assuring the integrity and security of data on all individuals who face risk through the business utilising data that concerns them directly
	Trust in data*	The extent to which data trails can be audited and information accuracy can be wholly proven

* Financial Services, Technology & Communications sectors only



Lens	Driver	Description
Ability	Accessibility	Does the company ensure easy and fair access to its products and services
	Fakery	Issues around health, nutrition, animal production, controlled substances, counterfeit
	Product Quality	Is the company affected by liability issues, recalls, questions over product quality
	Product Safety	Issues around market withdrawals, product testing, chemicals, contents, ingredients
	CEO	Focus on the company's CEO, leadership style, 'tone from the top'
	Data Safety	Issues around data breach/security/retention/use, proprietary data
	Product Design	Issues around lifecycle impact, packaging, distribution, sustainable production
	Customer Service	Customer/user service levels as defined by the customer/user
Beliefs	Integrity	The company's approach to managing risks and opportunities surrounding ethical conduct of business, including fraud, corruption, bribery and facilitation payments, fiduciary responsibilities, and other behavior that may have an ethical component.
	Business Conduct	The company's involvement in tax evasion, antitrust, bribery, corruption, fraud
	Privacy	The company's approach to personally identifiable information, data collection, obtaining consent
	Boycott	Any issues relating to a boycott of the company
	Employee Commitment	The actions around corporate culture, employee engagement, focus on customer-facing staff
	Social Responsibility	The company's engagement with charities, sponsorships, philanthropy, local collaborations
	Human Rights	A company's observance of community relations, human rights, indigenous justice
	Labor Standards	Issues around labour standards, labour law, accepted norms, minimum wage, living wage, regional pay
Consistency	Monopolist	The company's engagement in monopolistic practices, excessive pricing, legal expectations of service, price fixing
	Gaming the System	Issues around regulatory policy, subsidies, public interest, lobbying, rules compliance
	Circular Economy	The company's approach to renewable sourcing/energy, recycling, key materials, particularly plastics
	Climate Change	How the company impacts climate, global warming, shifting climate, sea level
	Selling Practices	Issues around mis selling, predatory selling, discriminatory advertising
	Environmental Impacts	The company's exposure to ecosystem, biodiversity, habitat, deforestation, air pollution, water pollution
	Supply Chain	The company's practices in regards to supply chain, recycling, plastics, reusability, living wages, exposure to trade wars, border conflicts
	Problem Solving	Issues related to product launch, adding value, solving customer pain points, staying relevant

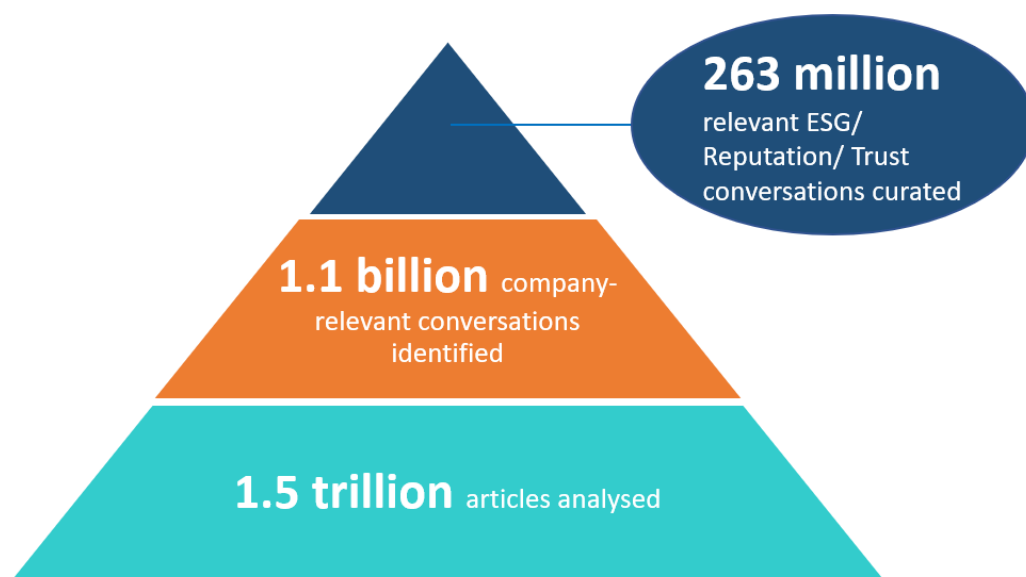


Sentiment Analysis

Mettle scores each conversation for sentiment – positive, neutral, negative – using a proprietary set of tailored Natural Language Processing models. Sentiment analysis is performed at a fragment level to ensure accuracy and entity recognition. Sentiment is calculated using probabilistic weights as conversation is rarely 100% positive or negative. Human-in-the-loop allows for audit, review, and incremental improvement. Mettle’s dashboard displays ‘volume-weighted net polarized sentiment’ – calculated as the sum of positive conversation minus the sum of negative conversation, divided by the sum of positive and negative conversation then weighted according to trailing average volume over the previous 720 days. This method provides the greatest correlation to subsequent share price movement.

Data Set Construction

Mettle’s data set starts on 1st January 2010 and is scored daily for sentiment across all the drivers where relevant conversation is found. Unlike other ESG data providers, Mettle does not calculate proxy scores to fill gaps in coverage. Unlike other Reputation data providers, Mettle does not take brand awareness to mean informed opinion. Unlike other Trust data providers, Mettle does not use small one-off survey samples to extrapolate global results. Scoring is by machine reading according to 62,000 contextualised keywords across standard 69 drivers. Data is updated weekly. The data set currently contains 263m conversations on 2,500 companies, 11 sector benchmarks, 77 sub-sector benchmarks, and 15 country benchmarks.





Materiality

Factoring for materiality at sector level is essential for strong correlation to subsequent share price movement. Mettle distinguishes between fundamental materiality - drivers with long-term stable volume - and emerging materiality - drivers with short-term volume increase/decrease. Mettle provides materiality weightings at lens level as a percentage of screen volume and at driver level as a percentage of lens level. Users can see which drivers are essential to a company's licence to operate, which present an emerging risk, and which can be safely ignored.

Quality Assurance

Searches are constructed as a balance between accuracy and breadth with care taken to capture emerging conversations. Mettle's weekly data collection is reviewed by human analysts for quality control. The cluster function in Mettle's dashboard is used *ad hoc* to review emerging conversational trends at subsector level that are then fed back to improve searches.

Data pipeline

Mettle sources traditional, social, and trade media in local language. Traditional media includes all media not behind a paywall and paywalled content shared by readers. Social includes blogs, forums, Twitter. Trade includes 'Fierce Pharma', 'Retail Week', 'American Journal of Transportation'. Languages currently include: English, Spanish, German, Italian, French, Dutch. Searches are global, tagged to country.

Data is collated via a combination of data aggregators. Searches are reviewed quarterly for accuracy and robustness.

Weighting Media Sources

Mettle does not subjectively weigh media sources but uses 'discovered weighting' of relevant volume. If a story appears on the front page of the New York Times, it will be commented on and referred to much more than a single blog post from the same journalist. By capturing and curating all the relevant conversation, the volume of the New York Times article will weight more than the blog post in the net sentiment score.



Data presentation

Mettle presents its data in five ways:

1. **Analysed** - the dashboard Overview tab shows a portfolio heatmap, historic momentum, volume-weighted net polarised sentiment, gross volume
2. **Bespoke** - the dashboard Focus tab offers all drivers, lenses, screens per company; benchmark comparators, materiality, keywords, map of conversations, cluster analysis
3. **At a glance** - the dashboard gives a snapshot on a company's latest data
4. **Ad hoc** - the dashboard allows users to select and export specific data
5. **API** - endpoints available for companies, sector, benchmark, driver, lens, screen. Customer connectors available for PowerBI, Tableau, Postman

Key Opinion Leaders

In Beta, currently only available on request. KOLs are isolated from the curated subsector conversation using network analysis and sector expertise. Existing KOL lists can also be added and backdated.

Conflict of Interest

Mettle is the only ESG data provider who does not source at least some of its data from issuers themselves. [Source: Nov 2020. 'Study on Sustainability Related Ratings, Data and Research', European Commission p.85] Unlike other leading Reputation or Trust data providers, Mettle does not sell consultancy/marketing services to the companies being measured. As a result, Mettle's data is freer from bias and potential "greenwashing".

Founded by Dr Andrew Tucker, a sustainability data scientist and Rufus Grantham, a capital markets & sustainable finance specialist, in late 2019.

www.mettle.capital



The data set has a number of different use cases. These include

- **ESG Integration** - for mitigating long term investment risk and for better risk adjusted performance
- **Reputational risk** - for avoiding regulatory, legal and consumer pressures
- **Brand trust** - for building brand equity with consumers

In each use case, a standard set of queries to the database is the starting point for analysis.

1. Trend over time

The data set starts on 1 January 2010 with full coverage of 2,500 entities; major market benchmarks, 11 sectors, 77 subsectors. Use the historic data to see trends that are not visible with short timeframes. Use the historic data to backtest the most relevant screens, lenses, drivers for specific use cases.

Goldman Sachs Reputation

180-day trailing sentiment vs S&P500, Investment Banking & Brokerage subsector

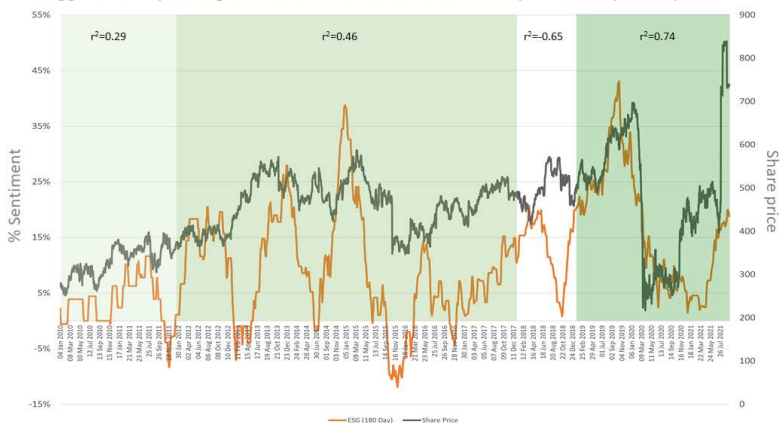


Mettle Capital



Which screen is most correlated to share price?

Meggitt 180-day trailing ESG sentiment correlated to subsequent 60-day share price



Source: Mettle Capital. Sentiment is pushed back by 60 days



2. Trend over time

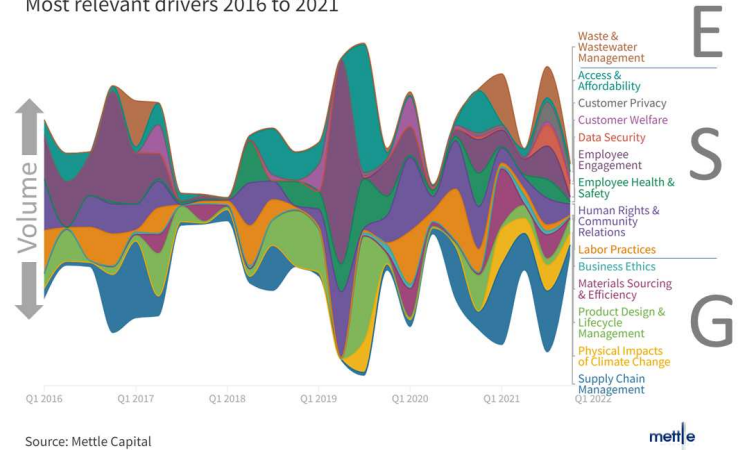
The three screens - ESG, Reputation, Trust - can be compared to relevant dependent variables. For example, 180-day trailing ESG sentiment and subsequent 60-day share price shows how the correlation improves over time. For improved fit, the most material drivers can be combined in to a bespoke screen.



3. Materiality

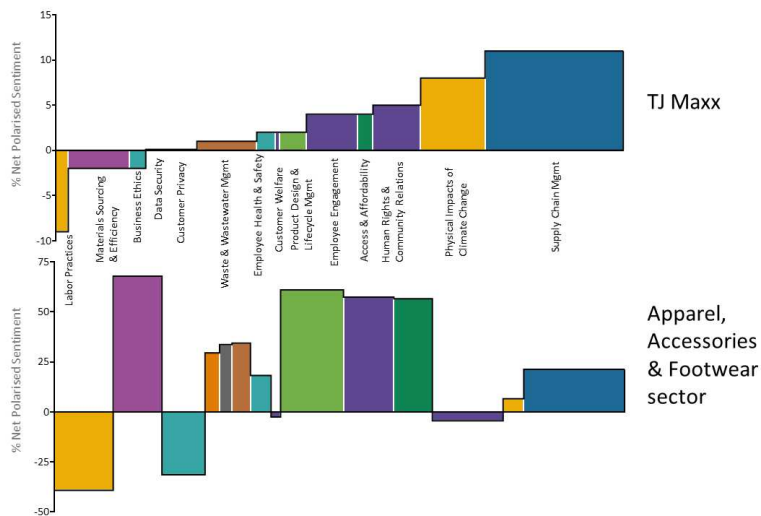
Materiality - what causes investors to make a decision - is essential to understanding ESG, Reputation, and Trust data. Taking the whole of the relevant conversation, Mettle Capital calculate which drivers are material on a weekly, monthly, quarterly basis. This allows you to focus on what matters rather than getting lost in the cacophony.

TJMaxx ESG materiality
Most relevant drivers 2016 to 2021



Source: Mettle Capital

Which drivers matter?
TJ Maxx vs sector year-to-date Volume vs Sentiment



4. Sector specific focus

Different sectors have different exposure to material drivers. Drill down into the sentiment of a sector's 26 material drivers of ESG performance; or 19 material drivers of reputation risk. Or build your own dynamic model utilizing materiality discovered through evolving stakeholder conversations.

5. Track risk in your portfolio

More broadly, the dataset enhances investor risk requirements for ESG. It also works for reputational risk and brand trust. A simple heatmap - updated weekly, monthly, or quarterly - enables risk reporting and stakeholder engagement.

Risk Heatmap
Selected Entities Sep 2021

Risk category: non material (grey), upside (green), downside (red), neutral (yellow)



Source: Mettle Capital

mettle



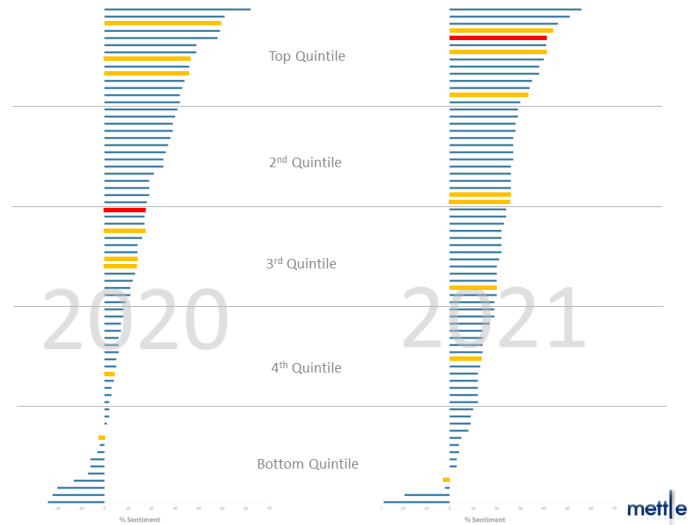
6. Relative analysis

Applying change in sentiment to stocks enhances a number of technical analyses, for example a line chart of relative performance against a peer group.

Relative Performance Goldman Sachs year-on-year Sentiment

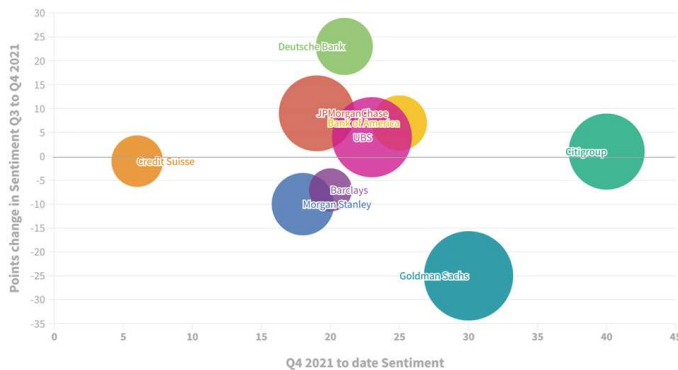
Broad Investment Banking
& Brokerage sector

- Goldman Sachs
- JPMorgan, Citigroup,
Bank of America,
Morgan Stanley,
Barclays, UBS, Credit
Suisse, Deutsche
Bank



Source: Mettle Capital

Selected Investment Banking & Brokerage sector Q4 vs Q3 on Reputation dimensions



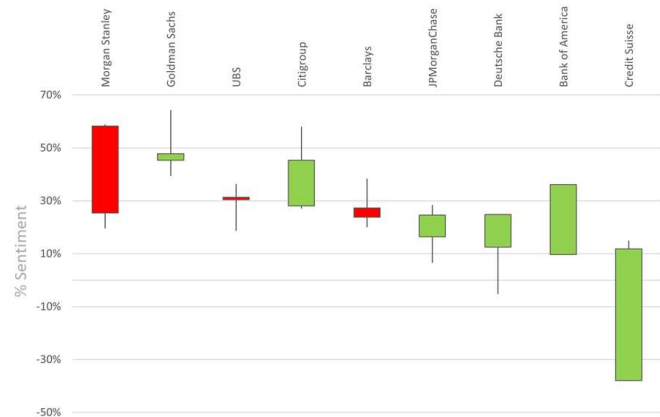
Source: Mettle.Capital • Size of bubbles indicates volume of relevant conversation in Q4 2021 to date



... or absolute performance against a peer group

... or a candlestick chart of equity patterns.

Selected Investment Banking and Brokerage sector Reputation dimensions Q3 and Q4 to date 2021



Source: Mettle Capital





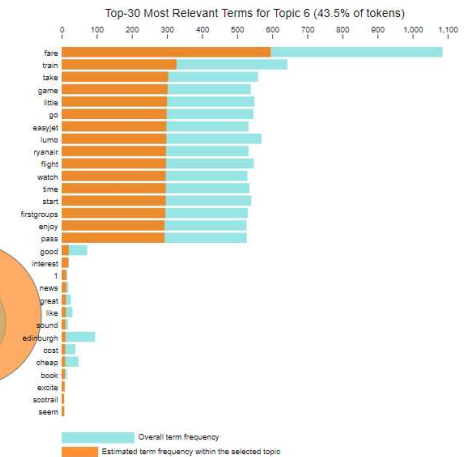
7. What is driving materiality?

Deploying a version of Latent Dirichlet Allocation across a conversation enables you to isolate the key conversations by keyword analysis, based on Mettle Capital's c.70k keywords lexicon. The size of the bubble indicates relative size of conversation. Closeness of bubbles indicates closeness of key conversations.

Intertopic Distance Map (via multidimensional scaling)



Most Salient Terms



Sample Hit Sentences

- Cluster 1
- Cluster 2
- Cluster 3
- Cluster 4
- Cluster 5
- Cluster 6
- Cluster 7
- Cluster 8
- Cluster 9
- RT @seatskyone: LUMO IS GO! FirstGroups new lo-cost London-Edinburgh trains will take on easyjet & Ryanair at their own game starting 25 October. 6 times less CO2 than a flight with fares from £14.90 - 60% of fares will be £30 or less. Im going to enjoy watching this - pass the popcorn... <https://t.co/pa8bVLQDWK>
- QT @seatskyone: RT @SmithLyle: More of this and less of #h21! LUMO IS GO! FirstGroups new lo-cost London-Edinburgh trains will take on easyjet & Ryanair at their own game starting 25 October. 6 times less CO2 than a flight with fares from £14.90 - 60% of fares will be £30 or less. Im going to enjoy watching this - pass the popcorn... <https://t.co/pa8bVLQDWK>
- QT @seatskyone: RT @TobySandison: Really hoping this is a success and leads to more routes having similar services! LUMO IS GO! FirstGroups new lo-cost London-Edinburgh trains will take on easyjet & Ryanair at their own game starting 25 October. 6 times less CO2 than a flight with fares from £14.90 - 60% of fares will be £30 or less. Im going to enjoy watching this - pass the popcorn... <https://t.co/pa8bVLQDWK>
- QT @seatskyone: About bloody time! 🙌; LUMO IS GO! FirstGroups new lo-cost London-Edinburgh trains will take on easyjet & Ryanair at their own game starting 25 October. 6 times less CO2 than a flight with fares from £14.90 - 60% of fares will be £30 or less. Im going to enjoy watching this - pass the popcorn... <https://t.co/pa8bVLQDWK>
- QT @seatskyone: Interesting development: recent #Euronext had 80% of BVL-PATH and LON-PATH passenger market at expense of #airfrance; LUMO IS GO! FirstGroups new lo-cost London-Edinburgh trains will take on easyjet & Ryanair at their own game starting 25 October. 6 times less CO2 than a flight with fares from £14.90 - 60% of fares will be £30 or less. Im going to enjoy watching this - pass the popcorn... <https://t.co/pa8bVLQDWK>

Cluster 10
Cluster 11
Cluster 12
Cluster 13
Cluster 14
Cluster 15
Cluster 16
Cluster 17
Cluster 18
Cluster 19
Cluster 20

8. Isolate main stories

Drilling down on a single conversation in the clusters analysis, you can see the main story at the centre of the cluster. Access to the full text is available under copyright.

Mettle Capital

Founded by Dr Andrew Tucker, a sustainability data scientist and Rufus Grantham, a capital markets & sustainable finance specialist, in late 2019.

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