

The background is a solid blue color with a subtle, semi-transparent pattern of financial data. It includes various currency symbols like 'USD' and 'EUR', along with line graphs and numerical values such as '12855', '34.4800', '0.6598', '0.9483', '1.0160', '121.4700', '0.8483', '1.2191', '1.3069', and '1.2258'.

THE VALUE OF DATA IN THE AGE OF UNCERTAINTY



While the COVID crisis is ongoing, we must still anticipate the post-pandemic world

Finding the opportunity in a world of uncertainty

The explosion in financial data, combined with greater machine intelligence, is reshaping the financial industry and helping markets to navigate the post-pandemic economy

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e're living in unpredictable times.

If, on January 1, 2020 you'd been asked to place a bet on the year ahead, it's unlikely anybody would have put their money on a global pandemic, oil prices going negative, or a growing trade war between the US and China. In March, just days after COVID-19 fears prompted the largest one-day market crash since 1987, the CBOE Volatility Index hit 82.69, its highest ever record; even in September, with markets recovering, volatility was twice as high as the same period in 2019.

In finance, an industry which relies on understanding and mitigating risk, COVID-19 has been a shock to the system. "The effects of COVID are not linear, and they don't apply equally everywhere," says David Craig, CEO at Refinitiv, the global financial data provider. Suddenly, in addition to their existing financial models, traders around the world need to understand the

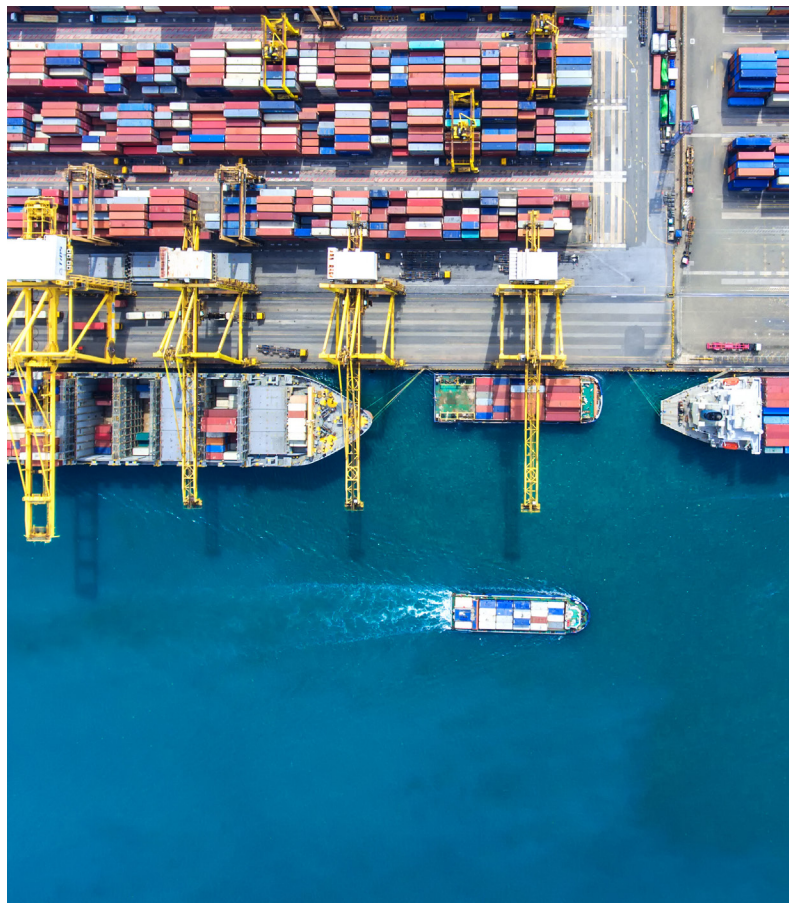
latest case counts, public health and central bank responses, and even information on vaccine pipelines. "On a day to day basis, we're trying to understand where the effects of COVID are increasing versus where they are decreasing, and then trying to estimate what the economic implications of those are at a macro level, down to the sector level and the company level," Craig says. "And of course, that involves a lot of financial data."

If recent global events – such as US-China tensions, Brexit – and now a world-wide pandemic, have highlighted one thing, it is the fragility of the market to external factors and their influence on financial and trading decisions. This has been crystallised in the belief that companies should do more than just make profit, and that failure to meet certain ESG standards in the public eye – from recent oil spillages to how employers have looked after their employees during this pandemic – can greatly influence financial performance and valuation.

It is now more important than ever for companies, regardless of industry or sector, to harness this proliferation of data, from social sentiment analysis to COVID cases and shipping forecasts, to make informed decisions and navigate these unpredictable and volatile times.

Information everywhere

From soil monitors to market moves, key data is more diverse than ever



Satellite imagery is just one of a range of data sources that can provide valuable insights

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ata, thankfully, is not in short supply.

If we are living in what World Economic Forum founder Klaus Schwab has called the Fourth Industrial Revolution, then data is the fuel that's powering it. The amount of data generated annually worldwide is expected to grow from 33 Zettabytes in 2018 to 175ZB in 2025, according to the analysis firm IDC. Today's traders have billions of data points at their fingertips, from up-to-the-microsecond updates on the financial markets, to millions of pages of financial reports, global news headlines and more, all of it streaming in real time. [Refinitiv's real time market data](#) provides

almost ten million price updates a second; its Eikon data analysis platform logs 40 billion market updates a day. Its tick data alone, going back to 1996, totals more than six petabytes.

The data explosion has also correlated with a transformation in the way that financial organisations deal with data; from the scale of advice that can be offered to clients to the rise in new skills required of the workforce. Banking, formerly a world of dusty server racks and Excel spreadsheets, is increasingly migrating to the cloud, and embracing code. "Go back ten years and there might have been a few data scientists that would sit in the corner of your investment bank. They might have interacted with what the portfolio managers or the investment bankers actually did, but not to a very large degree," says Leon Saunders Calvert, head of sustainable investing at Refinitiv. "The foundational change we've seen is that quantitative analysts are now data scientists – and indeed, bankers can now code. So, you want your bankers to not just be working in spreadsheets, but to be working in Python, in order to unearth correlations. That's a profound change."

Today's financial professionals are not just working with data of unprecedented speed and scale, they're also able to leverage a diverse and growing ecosystem of data sources. "There are lots of what people call 'alternative datasets' being created," says Amanda West, head of Refinitiv Labs, the company's innovation studio which works on breakthrough technologies such as machine learning. Alternative data streams (as opposed to fundamental data, which includes company and market data) range from satellite imagery and shipping data to smartphone geolocation, app installs and social media posts. And specialist data feeds can help drive insights for commodities and traders – sensor networks measuring soil quality, for example, might help analysts predict agricultural outputs, while also giving early indicators of the risks to commodity prices and even individual companies posed by climate change. "Anyone who's looking at retail is trying to use credit card data; anyone who's looking at indications of activity is trying to use geolocation; other people are consuming satellite imagery," says West.

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he [alternative data boom may provide analysts with vital insights](#) – but finding a competitive advantage within these alternative data sets is challenging work. New data sources need to be both reliable and high quality in order to find signal in the noise. “Robust sources of data are not particularly easy to come by,” explains Saunders Calvert.

“It is a case of rubbish in, rubbish out,” West agrees.

Refinitiv’s data specialists study new data sets intensively to ensure that they meet the standards required by financial markets. Data sources such as social media, for example, might be a useful insight into consumer sentiment around a company or sector, particularly in a time of controversy; but they are also open to manipulation and misinformation. For example, we have seen social media giants such as Facebook be accused of failing to take down 95 per cent of anti-vaccine misinformation reported during the pandemic. Satellite data, which analysts are increasingly using to track footfall at factories or retail spaces, or to track the flows of commodities like oil, is equally lacking in context – and must be verified by other sources. (A factory’s footfall might have fallen due to COVID lockdowns – it might also have been shut for retooling or other problems.)

Sourcing accurate and valuable data streams is one challenge, but making decisions based upon them is wholly another. “It’s not necessarily about entire

Not all data is equal

Quality is as important as quantity in the hunt to uncover insights of value



Data quality and connectivity across disparate data sources are critical in building next generation applications like artificial intelligence and machine learning

new sources of data,” says Saunders Calvert. “It’s actually: how do I correlate that new data to GDP? How do I correlate that to movements in the major indices?” In order for new data streams to help drive financial models, different data types that at first glance seem incompatible need to be connected, standardised, parsed and made machine readable. To that end, Refinitiv tags each piece of data with PermID, a unique machine-readable 64-bit number, including using a natural language processing (NLP) engine to tag unstructured text, such as articles from Reuters News that contain relevant information. By combining that disparate data, Refinitiv can create new tools for clients, including traders and quants, to navigate the data deluge.

One such tool is Mosaic, which was developed by Refinitiv Labs to explain extreme price moves. Mosaic is built to work on real-time streaming data; its machine learning algorithms detect sudden swings in a chosen price, then can call up related information, such as tagged news stories, to rapidly provide context. “If a price moves, and you can quickly start to show what might have driven that move, that’s hugely

valuable in financial services,” West says.

To navigate the data boom, financial service firms are increasingly turning to technology such as machine learning (ML) and artificial intelligence (AI). “There is immense value to be had with AI and ML in terms of joining together previously disconnected data sets,” West says. At present, machine learning’s capabilities are largely limited to descriptive and diagnostic functions – but can still provide value in finding signal in the data. Refinitiv created SentiMine which combines natural language processing, sentiment analysis and deep learning to provide insights from thousands of unstructured research reports and company transcripts quickly and efficiently. To increase the accuracy of the data, the natural language processing engine was trained using a large corpus of Reuters business news, to better understand financial reporting. “SentiMine looks across all the range of people writing about particular stock, and it’ll give you a sense of where there was either positive or negative sentiment about the stock, and where there’s commonality across analysts versus where there are outliers,” West says.



Machine learning can make sentiment analysis around ESG a lot more useful

ESG in the ascendant

Applying the new data – from ethical investing to improved diversity

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entiment analysis can also be used more widely to provide quick insights into specific businesses or sectors. For example, Refinitiv Labs has worked on applying sentiment analysis to environmental, social and governance (ESG) data. ESG data is growing rapidly in importance – net flows into ESG funds from July 2019 to July 2020 were up 135.21 per cent over the previous 12 month period, according to Refinitiv Lipper data. But ESG data can often be difficult to extract, usually being

found in company reports or news articles. “There’s still no mandatory reporting of ESG data,” Saunders Calvert says. The ESG data that is reported by companies is often self-selected and can provide an incomplete or misleading picture. That can make decisions difficult for ethical investment funds, or for traders and wealth advisers making moves in industries that might be influenced by concerns over sustainability, poor governance, compliance or allegations of financial crime.

To overcome some of these problems, Refinitiv is mining other sources of ESG data. Using 31,600 Reuters news articles, Refinitiv trained a machine learning algorithm to analyse sentiment data focused around 20 ESG topics. “We’ve created sentiment analysis whereby you score that news as being positive or negative,” says Saunders Calvert. The system can automatically flag any breaking news articles that the algorithm identifies as indicating a potential ESG controversy. “The trick is that we’ve then

worked to create the ESG model to be consistent with the fundamental data that we collect on ESG. That’s really important, that it actually maps to the way that we already score and manage companies,” says Saunders Calvert.

[As climate change plays an increasing role in financial markets](#), such insights into ESG are invaluable, Saunders Calvert says. “If you recognise the economy is decarbonising fast, you don’t want to be left with the equivalent of Blockbuster Video rather than Netflix.” Similarly, social causes can now indicate performance; some funds are asking companies to report diversity figures, reflecting growing consumer demand, but also the [increasing scientific evidence that greater diversity improves performance](#).



Markets were affected by the global outbreak – but it was possible to avoid calamity

Understanding risk in a pandemic

By parsing data in a smart way, opportunities can be identified

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hen the COVID-19 pandemic hit, and the financial markets were desperate for data on how the pandemic was going to impact the economy, Refinitiv launched a dedicated portal to collate relevant data on the

situation. Dubbed Macro Vitals, it centralised data on the outbreak, on the markets, on monetary and fiscal policy – like a heart-rate monitor, in a sense, for the global economy. But with additional data now available, and its work on extracting insights from complex data sets using techniques such as deep learning, Refinitiv Labs has recently been diving deeper into the pandemic and its implications for specific industries and companies.

“We really wanted to understand, what are the opportunities that our clients can actually take advantage of in this environment, versus the areas where they need to manage their risks,” Saunders Calvert says.

Using natural language processing techniques, West’s team annotated 7,500

news articles about the pandemic, then used them to train a machine learning model designed to detect whether an article mentioned “risk”, “opportunity”, or “none”. Using the PermID and tagging systems, they then associated the news articles with several other datasets. “We had to actually generate a relationship between the news and the company’s fundamental data, in order to generate either the positives or the negatives, the risks or opportunities associated with the pandemic,” West says. The result is a tool that lets investors not only understand the economic impact of COVID-19 in macro, but lets them drill down to compare how companies have been affected, and how that compares to their peers – and therefore how they might be impacted by any second wave.



Get ready for the future of finance

The next systems will be AI-driven and built around quantum and the cloud

Quantum, AI and cloud compute will take data analysis to the next level

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he data revolution in financial markets is being met with an equally profound technological shift: the migration of not only storage but computing power to the cloud. The combination of unprecedented amounts of financial data with near-limitless computational resources has enabled even startups to experiment with compute-intensive applications such as machine learning.

"The cost of compute has radically, radically changed over the last three or four years," West says.

"Fifteen years ago, to build applications you'd have to buy datacentre rackspace," agrees Rinesh Patel, Refinitiv's head of cloud computing. "The cloud is easily

accessible, whether you're a startup or an established provider. The field is suddenly becoming a lot more level." For example, Refinitiv's cloud platform enables access to its entire Tick History dataset going back as far as 1996 – with a huge 6PB of historical data available to it.

At Refinitiv Labs, West's team typically separates the machine learning tools it is working on into four classes: those that are descriptive, diagnostic, predictive, or prescriptive. Today, she says, despite the hype around artificial intelligence, most machine learning tools sit within those first two classes. "I don't think there are anywhere near as many people genuinely generating alpha – doing the predictive pieces – with AI as you think," West says.

Automating tasks, such as SentiMine extracting insights from news sources, will free up human capabilities to think creatively, and to test hypotheses. Once again, the quality of data is of paramount importance; if an AI is trained on biased data, it will produce results that reflect human bias. Fully automated trading, West explains, is unlikely in most fields; in the very least, traders will need to understand the models they're working on. "There will still be a human involved,"

says West. "This isn't going to be the march of the machines."

Still, West says, the development of dedicated machine learning hardware, as well as the advent of quantum computing, will accelerate AI's potential to process the data explosion even further. "If you look at the cost to conduct sophisticated machine learning – especially when you get into unsupervised and deep learning – it's really expensive," says West. "New chips are reducing the cost of compute. That will have a dramatic impact in terms of what it will enable."

In the near future, Patel says, the financial system will increasingly migrate away from an industry powered by Excel spreadsheets to one comprised of APIs and code – financial models becoming the equivalent of applications built on top of ever-growing data streams, where more traditional bankers are largely replaced by data scientists and engineers. "I suspect in ten years' time, maybe even five years' time, we'll look back at the way it works now and think, 'that is antiquated'," Craig says.

The COVID-19 pandemic has highlighted the risk of predictions. The stock market has recovered from its Black Thursday lows; so far, the crash in industries such as travel and tourism has been counteracted by a boom in the healthcare and technology sectors. Industries that had lagged in adopting digital have moved online, leading to massive growth in remote working and e-commerce. The indicators for a vaccine look promising, if unsure. Even so, faced with a warming planet, geopolitical unrest between the US and China, and an unknown road to economic recovery, only one thing is truly certain – that [understanding and embracing all forms of data will be vital for any company wanting to thrive in these uncertain times.](#)

About Refinitiv

Refinitiv is one of the world's largest providers of financial markets data and infrastructure, serving more than 40,000 institutions in approximately 190 countries. It provides leading data and insights, trading platforms, and open data and technology platforms that connect a thriving global financial markets community – driving performance in trading, investment, wealth management, regulatory compliance, market data management, enterprise risk and fighting financial crime.

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